



## Criteria 1

### Criterion 1 – Curricular Aspects (100)

#### Key Indicator- 1.3 Curriculum Enrichment (30)

##### 1.3.1 Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability in transacting the Curriculum

Sr. No.	Content ( Documents)
B	List of B. Arch courses which addresses crosscutting issue (Syllabus Pattern-2019, 2015 )
1	Syllabus Details 2019 Pattern <ul style="list-style-type: none"><li>• Course structure of Syllabus which addresses crosscutting issues</li><li>• Course details of Syllabus which addresses crosscutting issues.</li></ul>
2	Syllabus Details 2015 Pattern <ul style="list-style-type: none"><li>• Course structure of Syllabus which addresses crosscutting issues</li><li>• Course details of Syllabus which addresses crosscutting issues.</li></ul>
C	List of topics in Architectural Design Project course in 8. Arch Programme which addresses crosscutting issue (from 2018 to 2023)
D	List of events/ Programme/workshops/seminars etc.. organised by institute in B. Arch programme which addresses crosscutting issues (from 2017-18 to 2022- 23)



  
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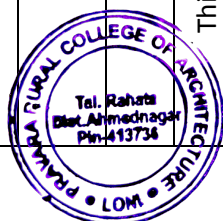
**B. List of B. Arch courses which addresses crosscutting issue (Syllabus Pattern-2019, 2015)**

Sr. No.	Syllabus Pattern	Year of Introduction	Class	Course Code	Course Name	Issues Addressed (Professional Ethics, Gender, Human Values, Environment and Sustainability )	Detailed Description
1	2015	2018-2019	First Year	1201506	Humanities	Human Values	To introduce the students to the study of humanities and its importance in understanding of human settlements and architecture.
2				1201507	Introduction to Architecture	Professional Ethics	To introduce students to the profession of architecture and its unique traits in comparison to other professions. The scope of architecture as a discipline and architecture as a profession
3				1201509	Design II	Human Values	To Understanding numerous design alternative methods such as binary, cyclic, intuitive, bio mimicry, and so on, as well as the role of literature, humanities, and case studies in the design process. Study of a neighbouring rural, semi-urban settlement/community for the purpose of studying, analysing, and documenting its building elements, open spaces, and architectural character.
4				1201509	Design II	Environment and Sustainability	To Recognise the harmonious connection between creativity and innovation.
5				1201515	Climatology	Environment and Sustainability	Considering climate as an element of architectural design and allowing students develop Climate Responsive design.



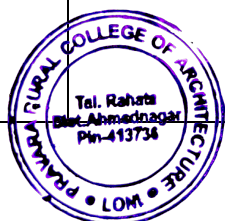


6	Second Year	2201517(ss)	Design III	Environment and Sustainability	Aesthetic, functional, technical, and environmental (Climate, Socio-Geographic) elements of architectural design.
7		2201526(ss)	Design IV	Human Values	The study of the settlement of a semi urban type community in an urban setting, as well as the research and documentation of occupant lifestyle, climatic and topographical response, semi-public constructed and open spaces, and associated character.
8		2201526(ss)	Design IV	Environment and Sustainability	To Comprehend site specific stimuli through responses to physical, Climate, visual, cultural contexts through indigenous construction. Technology, building materials, structure etc.
9		2201530(ss)	Building Services II	Environment and Sustainability	Introduction to rainwater harvesting and alternative energy sources.
10		2201534	Working Drawing I	Professional Ethics	To enable students to prepare working drawings of an architectural project and imbibe the significance of working drawings from the point of view of execution of the work on site and as important component of tender documents.
11		Third Year	3201535	Design V	Human Values
12	3201535		Design V	Environment and Sustainability	Undertake programming research to understand socio-cultural patterns, geographic context and address the needs of the users and site and evolve a Sustainable Design.





13			3201539(ss)	Landscape Arch. I	Environment and Sustainability	Creating awareness about using Landscape design as a tool to address Environmental Concern in Architecture. Introducing to environmental concerns and sustainable site planning (rain water harvesting, solid waste management, passive climatic control etc.)
14			3201540(ss)	Building Services III	Environment and Sustainability	To obtain knowledge of technical and design aspects of Natural Ventilation and HVAC
15			3201543(ss)	Working Drawing II	Professional Ethics	To imbibe further the importance of working drawings as an essential tool for effective site execution and execution of a building contract.
16			3201544(sv)	Design VI	Human Values	Exposure to universal design or accessible design concept
17			3201549(ss)	Landscape Arch. II	Environment and Sustainability	To study use of Landscape Design as a tool to address Environmental Concerns in Architecture. Introduction to site services like lighting, water management.
18		Fourth Year	4201554(sv)	Design VII	Human Values	Students are now expected to address spatial and visual language of their project with reference to the urban context and setting of their site.
19			4201556(pp)	Professional Practice I	Professional Ethics	To acquaint students with the Role of an Architect in society and understand the Duties, Responsibilities, Liabilities and Ethics as a Professional. To acquaint the student with the scope and avenues of professional architectural services and the demands and mode of professional practice and to prepare the student for professional field.
20			4201557(ss)	Urban Studies I	Professional Ethics	Introduction to Urban studies and its relevance in Architectural Profession. Affordable housing introduction and concepts.





21			4201560(pp)	Specification Writing I	Professional Ethics	To know importance of Specifications in contract document for any construction project. Specification as integral part of contract document.
22			4201562(sv)	Design VIII	Human Values	Students are now expected to address spatial and visual language of their project with reference to the urban context and setting of their site.
23		Fourth Year	4201562(sv)	Design VIII	Environment and Sustainability	Multi-functional/Speciality building in urban context with complexity addressing issues of Character, identity, built form, contextuality, advanced services, Green Initiatives, Landscape integration, with impact on immediate surroundings.
24			4201564(pp)	Professional Practice II	Professional Ethics	To familiarize and prepare students with adequate knowledge of an architect's office administration, documentation and procedures of office and site management.
25			4201565(ss)	Urban Studies II	Professional Ethics	Planning and urban design legislation - Introduction and relevance. Unified building bye laws and development control rules of local authorities.
26			4201565(ss)	Urban Studies II	Environment and Sustainability	Identification of urban issues related to various aspects such as environment, hills, riverfront development.
27			4201568(pp)	Specification Writing II	Professional Ethics	To know importance of specifications in contract document for any construction project. Technical and functional role of specifications in any construction project
28			4201568(pp)	Specification Writing II	Human Values	Broad outline specification for service installations - Accessibility arrangements for disabled persons.



  
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29	2019	2019-20	Fifth Year	5201570(sv)	Practical Training	Professional Ethics	To learn about architect's office management and learn about the process of design, execution and management of a project.
30				5201572(ss)	Elective IV	Professional Ethics	Architectural professionals will have to deal with more and more complex buildings as well as organizational structure to realize a project
31				5201572(ss)	Elective IV	Environment and Sustainability	Probable management elective topics include. Environment and energy management.
32	2019	2019-20	First Year	121915 (ss)	Fundamental of Architecture	Professional Ethics	Introduction to the profession of Architecture, its distinguishing characteristics with respect to other professions.
33				1201907 (ss)	Communication skills	Professional Ethics	Enhance skills required for effective communication in Architectural education and practice.
34				1201909 (sv)	Architectural Design I	Environment and Sustainability	Study & Analysis of a rural settlement and architecture wrt lifestyle, Climate and Solid structure.
35				1201909 (sv)	Architectural Design I	Human Values	Designing in the context of the studied settlement.
36				2020-21	Second Year	1201917 (sv)	Architectural Design II
37	Environment and Sustainability	To understand the Climatic aspects those have a bearing on architectural design and address climatic concerns like adequate light, ventilation, protection from rain, insulation, shading, heat gain, through passive strategies.					



  
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38			1201921 (ss)	Computer Aided drawing & Graphics	Professional Ethics	To enable the students to communicate an architectural idea / proposal in a legible and effective manner through various architectural presentations and rendering techniques.
39			1201922 (ss)	History of Architecture & Culture III	Human Values	To understand the relationship of religion and society with architecture
40			1201925 (ss)	Climatology	Environment and Sustainability	To understand climate as a determinant of architectural design and to enable the students to evolve climate responsive design.
41			1201926 (sv)	Architectural Design III	Human Values	To introduce students to socio-cultural aspects like lifestyle, culture, traditions, and their effect on architectural design etc. To understand the concept and principles of universal designs
42					Environment and Sustainability	To understand the Climatic aspects those have a bearing on architectural design and address climatic concerns like adequate light, ventilation, protection from rain, insulation, shading, heat gain, through passive strategies.
43			2201930 (ss)	Environmental science	Environment and Sustainability	Basic introduction to Multidisciplinary nature of environmental studies
44	2021-22	Third Year	3201935	Architectural Design IV	Human Values	To introduce students to socio-cultural aspects like lifestyle, culture, traditions, and their effect on architectural design etc. To understand the concept and principles of universal designs.
45					Environment and Sustainability	To understand the Climatic aspects those have a bearing on architectural design and address climatic concerns like adequate light, ventilation, protection from rain, insulation, shading, heat gain, through passive strategies





46			3201939 (ss)	Landscape Architecture	Environment and Sustainability	Creating awareness about using Landscape design as a tool to address concerns in Architecture.
47			3201939 (ss)	Landscape Architecture	Human Values	Introduction to Landscape design and its scope and their application in achieving functional, Aesthetic, environmental and cultural goals
48			3201940 (ss)	Elective I ( Contemporary Architecture)	Professional Ethics	To analyse the contemporary trends, approaches in architectural production in terms of design, practices, its perception, appreciation and critical discourses.
49			3201942 (ss)	Building Service III	Environment and Sustainability	Principles of working of natural ventilation, heating, cooling and HVAC systems, components, materials and provisions in architectural design
50			3201943 (ss)	Working Drawing I	Professional Ethics	To enable the students to prepare working drawings of an architectural project and imbibe the significance of working drawings from the point of view of execution of the work on site and as important component of tender documents.
51				Architectural Design V	Human Values	To introduce students to socio-cultural aspects like lifestyle. Culture, traditions, and their effect on architectural design etc. To understand the concept and principles of universal designs.
52			3201943 (ss)		Environment and Sustainability	To understand the Climatic aspects those have a bearing on architectural design and address climatic concerns like adequate light, ventilation, protection from rain, insulation, shading, heat gain, through passive strategies.

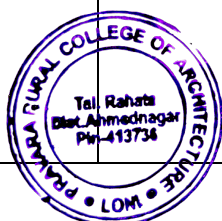


  
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53			3201952(ss)	Working Drawing II	Professional Ethics	To imbibe further the importance of working drawings as an essential tool for effective site execution and execution of a building contract.
54			4201953 [SV]		Human Values	To evaluate socio-cultural aspects like lifestyle, cultural beliefs and practices, traditions, etc. and their effect on housing design. To understand the economic concerns with respect to the economic hierarchy of society and the corresponding architectural responses and solutions.
55				Architectural Design VI	Professional Ethics	To understand and apply legislative aspects with reference to the housing context and setting of the project site (Building byelaws, GDCR, CRZ, EPA, ECBC, GRIHA etc.)
56	2022-23	Fourth Year			Environment and Sustainability	House Typology: To evaluate various housing typologies and their suitability to the project at hand. To explore various adaptations of a typology, clustering possibilities and resultant built form so as to create a housing design using the relevant explorations.
57			4201955 [SS]	Urban Studies I	Human Values	To understand complex issues of an urban context, generating design brief and taking design decisions. To enable students to understand the urban context of an Architectural Project beyond the site and understand the implications of various factors (such as traffic-transportation, socio economics, urban landscape, spatial and visual aspects etc.) influencing the development of an urban area.





58					Professional Ethics	To introduce the students to urban studies and relevance of its learning in Architecture profession; various theories and concepts, facilitating the undertaking of planning and design of large-scale land development.	
59				4201956 [SS]	Research In Architecture I	Environment and Sustainability	To enable students to carry out research focused on an issue related to the built environment, sustainability.
61				4201958 [pp]	Quantity surveying and Specification writing	Professional Ethics	To Introduce Estimation as an important Subject for Architecture. To Understand Different methods of Computing Quantities for items of work in a structure. To acquaint students with methodology of writing specifications with reference to building trades, materials, workmanship & performance of different items of work.



  
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62			4201959 [pp]	Professional Practice	Professional Ethics	To acquaint the student with the role & stature of the Architect in the society and understand duties, liabilities, responsibilities & ethics as a professional. To acquaint the student with the role & stature of the Architect in the society and understand duties, liabilities, responsibilities & ethics as a professional. To acquaint the student with the scope & avenues of Professional Architectural services and the demands & mode of Professional Practice field. To familiarize & prepare the student with the adequate knowledge of an Architect's office administration, documentation, banking, taxation & other procedures of office along with the Laws applicable to Architects. To familiarize the student with the Council of Architecture, Architect's Act, Architectural competitions & other allied professional organizations.
63			4201960 [SV]	Architectural Design VII	Human Values	To introduce the students to Urban spaces from cases, referral, live studies through the process of observation, survey and, documentation and evaluate them for gaining a design approach. To evaluate socio-cultural aspects like lifestyle, cultural beliefs and practices, traditions, and their effect on urban spaces and architectural design etc.
64					Professional Ethics	To understand and apply relevant legislative aspects governing building design with reference to the urban context and setting of the site (Building byelaws, GDCR, CRZ, EPA, ECBC, GRIHA etc.)





65			4201962 [SS]	Urban Studies II	Professional Ethics	To introduce the students to the process of planning and urban development and associated legislation. To understand the fundamental concepts and theories of urban design and apply them in their design projects. To introduce the students to urban economics.
66			4201964 [SS]	Elective IV ( Cultural Landscape )	Human Values &Environment and Sustainability	To Understand and analyse the cultural landscape of deferent areas from macro to micro level considering parameters like historic value, sociocultural value, environmental value , functional value, Natural values. For deriving landscape policies for potential areas.
68			4201965 [pp]	Quantity surveying and Specification writing II	Professional Ethics	To enable students in preparation of rate analysis & indent preparation along with the concepts. To enable students in working out quantities of various items of work for an Industrial structure To acquaint students with methodology of writing specifications with reference to service installations of different items of work in construction. To enable students in different building trades & content, checklist.



  
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69				4201966 [pp]	Project Management	Professional Ethics	Students need to understand reality of modern-day Project environment which is getting more complex and more collaborative due to ever demanding requirements of creative and unique design concepts and importance of Project Management to manage this dynamic environment. This course will be an introduction to basics of Project Management framework and Knowledge areas giving glimpses on best practices to manage collaborative project environment and roles and responsibilities of various stakeholders of Project and how Project manager leads to successful project completion within cost and time and meets or exceeds project quality standards.
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# SAVITRIBAI PHULE PUNE UNIVERSITY

[Formerly the University of Pune]



## COURSE STRUCTURE

**FIVE YEAR DEGREE COURSE IN ARCHITECTURE**

**[B.ARCH.]**

**TO BE IMPLEMENTED FROM 2019-20**

**BOARD OF STUDIES IN ARCHITECTURE  
FACULTY OF SCIENCE AND TECHNOLOGY**



# BACHELOR OF ARCHITECTURE COURSE STRUCTURE AND RULES

## PREAMBLE

The New Syllabus of the B.Arch. course hence forth to be referred as the 2019 Pattern, to be implemented from the year 2019-20, is designed to address the rising expectations of knowledge to be borne by an architect. The interdisciplinary nature of the field of architecture demands integration of knowledge domains from various disciplines such as humanities, art, and technology and so on. However, what distinguishes an architect is the design knowledge and ability to employ the knowledge from the various disciplines for arriving at a solution to a problem.

Hence the syllabus has been designed such that the professional core subjects are supported by building science and technology courses, professional ability enhancement courses and the elective courses. The professional ability enhancement courses and the practical training of one semester focus on connecting the students with the practice. The elective courses enable an exposure to some other domain or nurtures the students' proficiency or skill. The Audit courses are introduced to acknowledge the knowledge that the student seeks in his/her area of interest but not directly contribute to the CGPA.

At the end of the course the graduating student shall be able to methodically approach a problem of creating a built environment be it a small house or a township by employing knowledge from various domains and at the same time making it safe, equitable, feasible and environment friendly. Education needs to equip the student to face the challenges and demands in the field by imbibing first principles.

As per the University guidelines, the course is structured upon the Credit System Based Assessment. The syllabus is structured with the following objectives and expected outcomes

## PROGRAM EDUCATIONAL OBJECTIVES[PEO]-

1. **Theoretical Base**–To establish strong theoretical base and understanding of Architecture and work of an architect.
2. **Knowledge and Skills**–To inculcate design sensitivity and ability, as well as knowledge in the domains of humanities, technology & art and impart skills so as to equip the graduate student to undertake work of an architect.
3. **Values** - Sensitize the students to the universal values of equity, environmental care, accessibility, and respect for heritage and equip them to address these through design.
4. **Research** -Train the students to methodically research a issue or a situation to find a creative solution to meet the contextual challenges in the realm of changing technologies, socio economic and cultural changes.
5. **Practice and Ethics**- To enable the students to practice as architects and imbibe them with the knowledge of the professional practice and ethics.
6. **Changes and Diversification**- To expose the students to the changes in architectural practice, diversifications and evolving role of an architect.



## PROGRAM OUTCOMES [PO]

1. **Knowledge** -Understanding about role of various knowledge domains such as humanities, technology, and environment in design of built environment.
2. **Principles & Theory**- Knowledge of principles of architecture & theoretical knowledge and its application in design.
3. **Creativity** - Creative and design thinking ability.
4. **Practice** - Ability to understand real life situation of Architectural Practice and to work with ethical and professional responsibilities.
5. **Collaborative Working** -Ability to communicate effectively and work in interdisciplinary groups.
6. **Inclusivity** -Sensitivity in design for inclusivity, equity, environment, diverse cultures, and heritage.
7. **Technological Knowhow**-Ability to review, comprehend and report technological developments in the profession of architecture and construction.
8. **Ability to choose Area of Specialisation or Practise**- Able to judge one's area of interest and accordingly choose the field of practice.

### Rule no.1: ELIGIBILITY FOR ADMISSION.

Eligibility Criteria: Students seeking admission to First year of Bachelor's degree course in Architecture must fulfil the eligibility criteria laid down by Savitribai Phule Pune University / Govt. of Maharashtra / Council of Architecture as applicable from time to time.

### Rule no.2: SCHEME OF ASSESSMENT.

A candidate to be eligible for the degree of Bachelor of Architecture will be required to appear for and pass examinations as under:

	<b>Semester Numbers</b>	<b>Credits</b>
1	Semester 1	28
2	Semester 2	28
	<b>Total credits for First Year B.Arch.</b>	<b>56</b>
3	Semester 3	28
4	Semester 4	28
	<b>Total credits for Second Year B.Arch.</b>	<b>56</b>
5	Semester 5	28
6	Semester 6	28
	<b>Total credits for Third Year B.Arch.</b>	<b>56</b>
7	Semester 7	28
8	Semester 8	28
	<b>Total credits for Fourth Year B.Arch.</b>	<b>56</b>
9	Semester 9	14
10	Semester 10	24
	<b>Total credits for Fifth Year B.Arch.</b>	<b>38</b>
	<b>Total credits</b>	<b>262</b>

**Total Credits of the Course = 262**

Colleges may offer the students audit courses one per semester [Sem I to Sem VIII]. The students may choose to opt these courses. The passing in audit courses is by clearance and they are non-credits courses and are not part of the SGPA / CGPA calculation.





### **Rule no. 3: GRANTING OF TERM.**

Academic year shall consist of two semesters of minimum 90 teaching days each. The candidate will be permitted to appear for examination **only if** he/she produces testimonials from the Principal of the College for:

1. 75% attendance in each head of passing of theory and/ or sessional work as prescribed by the University.
2. Satisfactory completion of the sessional work prescribed for each subject and securing minimum required marks in the internal assessment for the same.
3. Good Conduct.

### **Rule no. 4: RULES OF PASSING**

- 4.1 To pass sessional [SS] / sessional viva [SV], the student has to earn minimum 50% marks.
- 4.2 To pass the theory subject head the student has to earn minimum of 45% marks in the End semester exam and minimum 45% average marks (In- Semester Assessment + End semester).
- 4.3 A student shall be promoted to higher class only if she/he scores 50% marks in the aggregate of the total marks of the year.
- 4.4 **For theory subjects** the failing student can repeat the end semester exam to pass the head in any semester and the In-semester assessment exam marks will be retained as it is. Or the failing student can repeat end semester exam as well as In-semester assessment for the head of even semester in the even semester only and for the head of odd semester in the odd semester.
- 4.5 To earn credits of a course (paper/SS/SV) student must pass the course with minimum passing marks / grade.
- 4.6 Student can apply only for the revaluation / photocopying / verification of answer sheets of End semester theory exam only.

### **Rule no. 5: RULES OF A.T.K.T.**

- 5.1 A student can be admitted for the third semester if he/she earns minimum **50%** credits of the total of first and second semester.
- 5.2 A student can be admitted for the fifth semester if he/she earns minimum **50%** credits of the total of third and fourth semester and all the credits (**100%**) of the first and second semester and passing grade of aggregate for first year.
- 5.3 A student can be admitted for the seventh semester if he/she earns minimum **50%** credits of the total of the fifth and sixth semesters and all the credits (**100%**) of the third and fourth semesters and passing grade of aggregate for second year.
- 5.4 A student can be admitted for the ninth semester if he/she earns minimum **50%** credits of the total of the seventh and eighth semesters and all the credits (**100%**) of the fifth and sixth semesters and passing grade of aggregate for third year.



5.5A student would be awarded B.Arch. only if he/she earns **262 (100%) credits** and gets passing grade in all the courses specified in the syllabus and gets passing grade of aggregate within the time permissible by the University.

**Rule No. 6: PREREQUISITES FOR ENROLLING FOR THE SUBJECT OF ARCHITECTURAL DESIGN and ARCHITECTURAL DESIGN PROJECT**

**6.1** A candidate shall not be permitted to enrol for the Architectural Design course in a semester unless he/ she has completed [*attended the course, submitted the work*] of the Architectural Design course of the previous semester and satisfied prerequisites as per 6.2.

**6.2 Prerequisites for appearing in Examination**

Sr.No.	Appear for examination in	Passing grade to be obtained in
01	Architectural Design III	Architectural Design I[SV]
02	Architectural Design IV	Architectural Design II[SV]
03	Architectural Design V	Architectural Design III[SV]
04	Architectural Design VI	Architectural Design IV[SV]
05	Architectural Design VII	Architectural Design V[SV]

**6.3** A candidate shall not be permitted to enrol for the tenth semester Architectural Design project course unless he/ she has successfully completed [*passed*] and received passing grades in Practical Training/ Internship and Architectural Design VI & Architectural Design VII.

**The rules of Passing, ATKT and Prerequisites have to be read in conjunction with each other and not in isolation.**

**Rule no. 7: ASSESMENT AND GRADE POINT AVERAGE**

**7.1** A grade assigned to each head based upon marks obtained by the student in examination of the course.

**Table 1  
GRADING SYSTEM FOR PASSING HEADS (THEORY)**

Grade	Grade Points	% of Marks Obtained	Remarks
O	10	90-100	Outstanding
A	9	80-89	Very good
B	8	70-79	Good
C	7	60-69	Fair
D	6	50-59	Average
E	5	45-49	Below average
F	0	Below 45	Fail



**Table 2**  
**GRADING SYSTEM FOR [SESSIONAL/ SESSIONAL VIVA and AGGREGATE]**

Grade	Grade Points	% of Marks Obtained	Remarks
O	10	90-100	Outstanding
A	9	80-89	Very good
B	8	70-79	Good
C	7	60-69	Fair
D	6	50-59	Average
F	0	Below 50	Fail

- 7.2 Passing grades for various heads:** The grades O, A, B, C, D & E are passing grades for theory papers. The grades O, A, B, C & D are passing grades for sessional and/or sessional viva voce heads. A candidate acquiring any one of these grades shall be declared as pass only in that particular head.
- 7.3 Passing grades for Aggregate:** The grades O, A, B, C & D are passing grades in the aggregate.
- 7.4 F grade for various heads:** The grade F is a failure grade. The student with F grade will have to pass the concerned course by reappearing for the examination.
- 7.5 F grade for aggregate:** The grade F is a failure grade for aggregate. The student with F grade will have to appear for paper &/ or sessional &/ or sessional viva voce for improvement of aggregate.

**Rule no. 8: EXAMINATIONS.**

The type of examination / assessments are as follows

- I. In Semester Examinations for Theory conducted and assessed at the college
- II. End Semester Theory Paper conducted by the University and assessed at the CAP by the University.
- III. Continuous Assessment for Sessional to be maintained and record to be kept by the subject faculty. The progressive work done by a student through out the semester to be maintained for architectural design course. The weightage of this continuous internal assessment [CIA] shall be 50% of the total marks allocated for the sessional work. The remaining marks to be given by the external examiner referred as External assessment [EA]. CIA and EA will be entered as aggregate at the time of external examination. Break up of marks is mentioned in detailed syllabus at respective subjects.
- IV. Viva voce to be jointly conducted by internal and external examiner at the end of the semester and the weightage for internal and external examiner's assessment will be equal [50:50] and break up of marks is mentioned in detailed syllabus at respective subjects.
- V. For subjects having both sessional assessment and viva voce the marks to be entered as an aggregate of sessional and viva voce.



## Structure of Theory Subject Assessment

8.1 The theory subject assessment shall be conducted in two phases for the subjects [Except Architectural Design V paper] as indicated in the structure viz.: In Semester assessment and End Semester examination. This structure of assessment/examinations shall be as below: -

	Time	Mode	Syllabus Coverage	Duration	Max. Marks
In semester Assessment	After the End of 6 <sup>th</sup> week but before the end of 8 <sup>th</sup> week	As mentioned in point 8.2 below	Unit I & II	60 minutes	30
End Semester Examination	End of Semester	Written	All Units	150 minutes	70

8.2 The in semester assessment can be in one of the following format- Tutorial / Class test/ Open book test/Time bound assignment/MCQ type Quiz/ and any other innovative time bound assignment to assess the learning of the student. The assessment record to be kept with the college and submitted to the University as and when demanded.

## Rule no. 9: CONDUCT AND ASSESSMENT OF EXAMINATIONS.

### Theory Assessment

- 9.1 In-Semester Assessment: Shall be carried out at concerned college by the subject faculty as per rule no. 8 above.
- 9.2 End-Semester Examination: Shall be carried out at concerned college as per 8.1 above and schedule of examination program and the question paper for theory exam will be made available by the University.
- 9.3 End-Semester Examination Assessment: Will be done at the CAP centre by the examiners appointed by the University.

### Sessional Work Assessment.

- 9.4 The sessional and /or viva examinations is to be conducted and assessed by external and internal examiner approved by the University.
- 9.5 In respect of Sessional work at F. Y. B.Arch., S. Y. B.Arch., T. Y. B.Arch. Fourth Yr. B.Arch. and Fifth Year B.Arch. it shall be continuously assessed by the teacher during semester. The progressive work done by a student in architectural design through out the semester to be maintained.
- 9.6 Performance of Sessional / Viva-voce Examination shall be assessed on the basis of understanding of the concepts and principles of the content and not on the basis of mere completeness of results and ornamental or colourful presentation.
- 9.7 Drawings and reports / notes shall be manually prepared. Students may use computers for sessional work under the guidance of the teachers where nature of work is individual and stress is on content rather than skill. The work done by the students has to be authenticated for its originality by the concerned teachers.



- 9.8 At all the examinations **except** for the SEMESTER X : ARCHITECTURAL DESIGN PROJECT, external assessment shall be carried out by teachers from other college in the University not teaching that subject in the institute where the examination is being conducted.
- 9.9 For tenth semester Architectural Design Project an external examiner means a professional/ academician not teaching in any of the colleges under the University and Internal Examiner is one who is teaching that particular subject in the same/any other college under the University.
- 9.10 Any examiner shall have a minimum of three years teaching/professional experience in a field of study relating to the subject of examination. However an external examiner for 10<sup>th</sup> Semester Architectural Design Project Shall have minimum of 10 years teaching/professional experience.

**Rule no.10: PERFORMANCE INDICES**

- 10.1 The semester end grade sheet will contain grades for the course along with titles and SGPA. Final grade sheet and transcript shall contain CGPA.
- 10.2 SGPA: The performance of a student in a semester is indicated by a number called the semester grade point average (SGPA). The SGPA is the weighted average of grade points obtained in all the courses registered by the student during the semester.

Semester Grade Point Average (SGPA) =

$$\begin{aligned}
 \text{SGPA} &= \frac{\sum_{i=1}^p C_i G_i}{\sum_{i=1}^p C_i} \\
 &= \frac{\sum \text{Grade Points earned} \times \text{Credits for each course}}{\text{Total Credits}}
 \end{aligned}$$

For example : Suppose in a given semester a student has registered for five courses having credits C1, C2, C3, C4, C5 and his / her grade points in those courses are G1, G2, G3, G4, G5 respectively, Then the SGPA would be

$$\begin{aligned}
 \text{SGPA} &= \frac{C1G1 + C2G2 + C3G3 + C4G4 + C5G5}{C1 + C2 + C3 + C4 + C5}
 \end{aligned}$$

**SGPA** is calculated up to two decimal places by rounding off.

1. **CGPA** : The CGPA is the weighted average of the grade points obtained in all the courses (theory /sessional / sessional vivavoce) of **all the ten** semesters. It is calculated in the same manner as the SGPA. It is calculated based upon the SGPA of the concerned semesters.



### Rule no. 11: RESULT

Based on the performance of the student in the semester examinations, the Savitribai Phule Pune University will declare the results and issue the Semester grade sheets. The class shall be awarded to a student on the CGPA calculated in rule no. 10(3). The award of the class shall be as per the table no. 3 below.

**Table 3**

<b>Sr.No.</b>	<b>CGPA</b>	<b>Class of the degree awarded</b>
1	7.75 or more than 7.75	First class with distinction
2	6.75 or more but less than 7.75	First class
3	6.25 or more but less than 6.75	Higher second class
4	5.5 or more but less than 6.25	Second class

### Rule no. 12: EXEMPTIONS

In case a candidate fails in an examination but desires to appear again,

- Examinations will be held in Oct./Nov.& Apr/May.
- He/She may be exempted from appearing in the head/s of passing in which he/she has passed.
- The students failing to get minimum passing grade for aggregate in a year can also appear for the examinations (paper and/or sessional and/or sessional-viva-voce) to enhance their marks in maximum four heads.
- The above a, b and c are subject to the provisions of passing, ATKT and pre-requisites rules mentioned in these rules and regulations.

### Rule no. 13: INTRODUCTION OF THIS CURRICULUM.

The new curriculum for the Degree course in Architecture B.Arch. will be introduced gradually as under:

- First Yr. B. Arch. Course from June 2019
- Second Yr. B. Arch. Course from June 2020
- Third Yr. B. Arch. Course from June 2021
- Fourth Yr. B. Arch. Course from June 2022
- Final Yr. B. Arch. Course from June 2023

### Rule no. 14: OTHER RULES.

University may frame additional rules and regulations or modify these regulations if needed and once approved by the University they would be binding on the students.



## COURSE STRUCTURE BACHELOR OF ARCHITECTURE [B.Arch.]

The syllabus structure is based upon 28 clock hours per week for 1<sup>st</sup> to fourth year. Additionally 2 clock hours per week are assigned for utilisation for the lectures / allied activities focussing on the individual philosophy of the institute in form of audit courses / site visits / special lectures / workshops / seminars etc offering choice based activities for the institutes / students. The periods considered for calculating the teaching load are of 60 min duration. The architectural design / architectural design project and building construction studio credits are calculated as 1 hour = 1.5 credits, allied studios/labs/workshops are calculated as 1 hour = 0.5 credits and theory lectures are calculated as 1 hour = 1 credit. The detail structure of the syllabus for the ten semester course is given below.

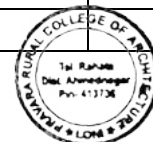
**(Note: SS= Sessional work; In Sem = In Semester exam ; End Sem = End semester exam; SV= Sessional and Viva voce; L= Lecture, S=Studio, T=Total ; Theory Paper -P**

### FIRST YEAR B.ARCH. SEMESTER I

Course Code	Course Title	L	S	T	Theory		Sessional and / Viva		Total Marks	Credits
					In Sem	End Sem	SS	SV		
1201901	Basic Design	1	6	7			250		250	10
1201902	Building Construction & Materials I[P]	2		2	30	70			100	2
1201903	Building Construction & Materials I[SV]		3	3				100	100	5
1201904	Theory of Structures I	2		2	30	70			100	2
1201905	Architectural Graphics and Drawing I	1	4	5			100		100	3
1201906	History of Arch & Culture I	1	2	3			50		50	2
1201907	Communication Skills	2	1	3			50		50	2
1201908	Workshop I	1	2	3			100		100	2
		10	18	28					850	28
1201917	Audit Course									

### FIRST YEAR B.ARCH. SEMESTER II

Course Code	Course Title	L	S	T	Theory		Sessional and / Viva		Total Marks	Credits
					In Sem	End Sem	SS	SV		
1201909	Architectural Design I	1	6	7				250	250	10
1201910	Building Construction & Materials II[P]	2		2	30	70			100	2
1201911	Building Construction & Materials II[SV]		3	3				100	100	5
1201912	Theory of Structures II	2		2	30	70			100	2
1201913	Architectural Graphics and Drawing II	1	4	5			100		100	3
1201914	History of Arch & Culture II	1	2	3			50		50	2
1201915	Fundamentals of Architecture	2	1	3			50		50	2
1201916	Workshop II	1	2	3			100		100	2
		10	18	28					850	28
1201918	Audit Course									



**SECOND YEAR B.ARCH. SEMESTER III**

Course Code	Course Title	L	S	T	Theory		Sessional and / Viva		Total Marks	Credits
					In Sem	End Sem	SS	SV		
2201917	Architectural Design II	1	6	7				250	250	10
2201918	Building Construction & Materials III[P]	2		2	30	70			100	2
2201919	Building Construction & Materials III[SV]		3	3				100	100	5
2201920	Theory of Structures III	2		2	30	70			100	2
2201921	Computer Aided Drawing and Graphics	1	3	4			50		50	2
2201922	History of Arch & Culture III	1	2	3			50		50	2
2201923	Building Services I[P]	2	0	2	30	70			100	2
2201924	Building Services I[SS]	0	2	2			50		50	1
2201925	Climatology	1	2	3			50		50	2
		10	18	28					850	28
2201935	Audit Course									

**SECOND YEAR B.ARCH. SEMESTER IV**

Course Code	Course Title	L	S	T	Theory		Sessional and / Viva		Total Marks	Credits
					In Sem	End Sem	SS	SV		
2201926	Architectural Design III	1	6	7				250	250	10
2201927	Building Construction & Materials IV[P]	2		2	30	70			100	2
2201928	Building Construction & Materials IV[SV]		3	3				100	100	5
2201929	Theory of Structures IV	2		2	30	70			100	2
2201930	Environmental Science	1	2	3			50		50	2
2201931	History of Arch & Culture IV	1	2	3			50		50	2
2201932	Building Services II[P]	2	0	2	30	70			100	2
2201933	Building Services II[SS]	0	2	2			50		50	1
2201934	Site Survey and Analysis	1	3	4			50		50	2
		10	18	28					850	28
2201936	Audit Course									





**THIRD YEAR B.ARCH. SEMESTER V**

Course Code	Course Title	L	S	T	Theory		Sessional and / Viva		Total Marks	Credits
					In Sem	End Sem	SS	SV		
3201935	Architectural Design IV	1	6	7				250	250	10
3201936	Building Construction & Materials V[P]	2		2	30	70			100	2
3201937	Building Construction & Materials V[SV]		3	3				100	100	4
3201938	Theory of Structures V	2		2	30	70			100	2
3201939	Landscape Architecture	1	3	4			100		100	3
3201940	Elective I [Contemporary Architecture]	1	2	3			100		100	2
3201941	Building Services III[P]	2	0	2	30	70			100	2
3201942	Building Services III[SS]	0	1	1			50		50	1
3201943	Working Drawing I	1	3	4			100		100	2
		10	18	28					1000	28
3201953	Audit Course									

**THIRD YEAR B.ARCH. SEMESTER VI**

Course Code	Course Title	L	S	T	Theory		Sessional and / Viva		Total Marks	Credits
					In Sem	End Sem	SS	SV		
3201944	Architectural Design V[SV]		5	5				250	250	8
3201945	Architectural Design V*[P]	2		2		100			100	2
3201946	Building Construction & Materials VI	2	3	5				150	150	6
3201947	Theory of Structures VI	2		2	30	70			100	2
3201948	Research In Architecture I	1	2	3			50		50	2
3201949	Elective II	1	3	4			100		100	3
3201950	Building Services IV[P]	2		2	30	70			100	2
3201951	Building Services IV[SS]		1	1			50		50	1
3201952	Working Drawing II	1	3	4			100		100	2
		11	17	28					1000	28
3201954	Audit Course									

\*The Architectural Design V [Paper] will be of 12 hours duration spread over two days of 6 hours a day. The first day will be 6 hours without break. The second day will be 6 hours with a break after 3 hours.



**FOURTH YEAR B.ARCH. SEMESTER VII**

Course Code	Course Title	L	S	T	Theory		Sessional and / Viva		Total Marks	Credits
					In Sem	End Sem	SS	SV		
4201953	Architectural Design VI	1	7	8				300	300	11
4201954	Advanced Building Construction & Services I	1	2	3				150	150	4
4201955	Urban Studies I	2	2	4			100		100	3
4201956	Research In Architecture II	1	2	3			50		50	2
4201957	Elective III	1	2	3			50		50	2
4201958	Quantity Surveying & Specification Writing I	2	2	4	30	70			100	3
4201959	Professional Practice	2	1	3	30	70			100	3
		10	18	28					850	28
4201967	Audit Course									

**FOURTH YEAR B.ARCH. SEMESTER VIII**

Course Code	Course Title	L	S	T	Theory		Sessional and / Viva		Total Marks	Credits
					In Sem	End Sem	SS	SV		
4201960	Architectural Design VII	1	7	8				300	300	11
4201961	Advanced Building Construction & Services II	1	2	3				150	150	4
4201962	Urban Studies II	2	2	4			100		100	3
4201963	Elective IV	1	2	3			50		50	2
4201964	Elective V	1	2	3			50		50	2
4201965	Quantity Surveying & Specification Writing II	2	2	4	30	70			100	3
4201966	Project Management	2	1	3	30	70			100	3
		10	18	28					850	28
4201968	Audit Course									



**FIFTH YEAR B.ARCH. SEMESTER IX**

Course Code	Course Title	L	S	T	In Sem	End Sem	Sessional and / Viva		Total Marks	Credits
							SS	SV		
5201967	Practical Training							250	250	14

**FIFTH YEAR B.ARCH. SEMESTER X**

Course Code	Course Title	L	S	T	In Sem	End Sem	Sessional and / Viva		Total Marks	Credits
							SS	SV		
5201968	Architectural Design Project	3	10	13				550	550	18
5201969	Entrepreneurship Development	2	2	4			100		100	3
5201970	Elective VI*	1	3	4			100		100	3
		6	15	21						24

\*Elective VI is preferably offered as an open elective. In case it is not possible to offer open elective colleges should offer any elective from the list of electives which the student has not undertaken earlier.



## ANNEXURE A : AUDIT COURSES

The student can opt for one audit course in a semester. A student can opt for a particular course from the list below only once and cannot repeat the same course. The courses may be offered based upon the availability of resources in a college. The method of conduct of course could be based on lectures, site visits, small projects, online sources etc. and can be devised by individual colleges. The course outline given is only suggestive and colleges can expand or modify it for enrichment of the course.

FIRST YEAR B.ARCH. [ANY ONE COURSE TO BE OFFERED PER SEMESTER FROM THE FOLLOWING]			
Sr. No.	Code	Title	Brief Course Outline
1	A	Crafts	Introduction to crafts across the world through history. Types of Indian crafts. Study of any one craft of India.
2	B	Creative Writing	Writing as an art. Fictional and non fictional writing. Poetry, short stories, playwriting. Famous Indian writers, poets and play wrights and their works.
3	C	Performing Arts	Introduction to performing arts across the world through history. Types of Indian performing arts. Introduction to Natya-Shastra. Classical, folk, traditional performing arts. Dance, Music, Drama, Cinema.
SECOND YEAR B.ARCH. [ANY ONE COURSE TO BE OFFERED PER SEMESTER FROM THE FOLLOWING]			
4	D	Foreign Language	Basic introduction to German or Japanese language or a language which a college may choose to offer – syllables, pronunciations, words, simple sentences, grammar.
5	E	Cyber security	Introduction to cyber crime. Types of cyber crimes. Do and don'ts while using computers, smart phones, internet. Security measures to protect from crime. Crime detection mechanism and legislation.
6	F	Yoga	Introduction to Yoga. Benefits of Yoga. Types of yogasanas.
THIRD YEAR B.ARCH. [ANY ONE COURSE TO BE OFFERED PER SEMESTER FROM THE FOLLOWING]			
7	G	Basics of Accounting and Book keeping	Introduction to accounting and various terminologies. Maintaining books of account. Debit and credit.
8	H	Electrical Maintenance	Basic electrical gadgets in home and offices. Introduction to problems related to electricity supply in home environments. Precautions while handling electrical gadgets and wiring. Mechanism of protection from electrical hazards.
9	I	Culinary Art and Practices	Introduction to the basic need of food. Geographical and cultural factors affecting food. Various cuisines and culinary arts across the world. Social, health, dietary, aspects of cuisines. Food cultures in modern times. Places of food.
FOURTH YEAR B.ARCH. [ANY ONE COURSE TO BE OFFERED PER SEMESTER FROM THE FOLLOWING]			
10	J	Civics	Constitution of India. Indian democracy. Citizenship and Rights and responsibilities of citizens. Legislative framework.
11	K	Right to Information	Right to Information Act in India. Its need, scope and significance. Use of right to information. Responsibilities of using RTI. Limitations of using RTI. Case studies and legal precedents of using RTI.
12	L	Sign Language	Introduction to need and significance of inclusive social environment. Communication with the persons who have hearing and speech disabilities. Learning sign language.

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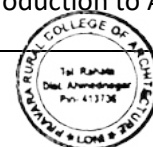


## ANNEXURE B : LIST OF ELECTIVE COURSES.

Following are the broad streams and electives under them which can be offered in a college. A student can select any one elective from any stream for **electives II to V each**. A student may adhere to a particular stream of elective of his/her choice and **nurture his/her area of interest and develop his/her expertise**. However colleges have to ensure that the student does not repeat a particular elective.

**Elective VI** is preferably offered as an **open elective**. In case it is not possible to offer open elective colleges should offer any elective from the list of electives which the student has not undertaken earlier.

Codes for stream A	Stream A Art / Design	Codes for Stream B	Stream B Technology / Management	Codes for stream C	Stream C Social/Humanities/History
A1	Product Design	B1	Architecture using Glass	C1	Gender and Architecture
A2	Furniture Design	B2	Architecture using Steel	C2	Architecture of South Asia
A3	Interior Design	B3	Mud Architecture	C3	Architectural Anthropology
A4	Architectural Conservation	B4	Pre fabricated construction	C4	Vernacular Architecture
A5	Universal Design	B5	Pre stressed construction	C5	Culture and Design
A6	Advanced Landscape Design	B6	Disaster Mitigation and Management	C6	Sociology and Architecture
A7	Graphic Design	B7	Green Buildings and Rating Systems	C7	Colonial Architecture
A8	Architectural Photography	B8	Sustainable Cities and Communities	C8	Regional Architecture
A9	Art in Architecture	B9	Building Performance and Compliance	C9	Cultural Landscapes
A10	Theory of Design	B10	Appropriate Building Technologies	C10	Slum Rehabilitation
A11	Urban design	B11	Earthquake Resistant Architecture	C11	Basics of Archaeology
A12	Architectural	B12	Tensile Structures	C12	Introduction to Anthropology



<b>Codes for stream A</b>	<b>Stream A Art / Design</b>	<b>Codes for Stream B</b>	<b>Stream B Technology / Management</b>	<b>Codes for stream C</b>	<b>Stream C Social/Humanities/History</b>
	Journalism				
A13	Music and Space	B13	Facility Management	C13	Environmental Psychology
A14	Healthcare Design	B14	Geographic Information System	C14	Ekistics
A15	Hospitality Design	B15	Parametric modelling	C15	Ecology
A16	Industrial Buildings Design	B16	BIM (Building Information Modelling)	C16	Politics and Architecture
A17	Way finding and Navigation	B17	Introduction to Programming and Embedded Design for Architects	C17	Indology
A18	User experience design	B18	Intelligent Building Systems	C18	Affordable Housing

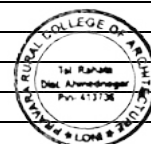
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Equivalence of Subjects for 2015 Pattern and 2019 Pattern			
1. Both 2015 and 2019 Syllabi of B. Arch are semester patterns			
2. Some subjects are newly introduced in 2019 pattern ,hence the candidate has to take the courses In these subjects			
* indicates new subjects introduced in 2019 syllabus			
FIRST YEAR SEMESTER I and II			
2015 Pattern		2019 Pattern	
Subject Code	Subject	Subject Code	Subject
1201501	Design I (SV)	1201901	Basic Design (SS)
1201502	Building Technology & Materials I (SV)	1201903	Building Construction & Materials I (SV)
1201503	Building Technology & Materials I (PP)	1201902	Building Construction & Materials I (PP)
1201504	Theory of Structures I (PP)	1201904	Theory of Structures I (PP)
1201505	Arch Drawing & Graphics I (SS)	1201905	Architectural Graphics and Drawing I (SS)
1201506	Humanities (SS)	1201906	History of Arch. & Culture I (SS)
1201507	Introduction to Architecture (SS)	1201915	Fundamentals of Architecture (SS)
1201508	Workshop I (SS)	1201908	Workshop I (SS)
1201509	Design II (SV)	1201909	Architectural Design I (SV)
1201510	Building Technology & Materials II (SV)	1201911	Building Construction & Materials II (SV)
1201511	Building Technology & Materials II (PP)	1201910	Building Construction & Materials II (PP)
1201512	Theory of Structures II (PP)	1201912	Theory of Structures II (PP)
1201513	Arch Drawing & Graphics II (SS)	1201913	Arch Drawing & Graphics II (SS)
1201514	History of Architecture I (SS)	1201914	History of Arch. & Culture II (SS)
1201515	Climatology (SS)		to appear
1201516	Workshop II (SS)	1201916	Workshop II (SS)
		1201907	Communication Skills**

SECOND YEAR SEMESTER III and IV			
2015 Pattern		2019 Pattern	
Subject Code	Subject	Subject Code	Subject
2201517	Design III (SV)	2201917	Architectural Design II (SV)
2201518	Building Technology & Materials III(SV)	2201919	Building Construction & Materials III (SV)
2201519	Building Technology & Materials III(PP)	2201918	Building Construction & Materials III (PP)
2201520	Theory of Structures III	2201920	Theory of Structures III
2201521	Building Services I (SS)	2201924	Building Services I (SS)
2201522	Building Services I (PP)	2201923	Building Services I (PP)
2201523	History of Architecture II (SS)	2201922	History of Arch & Culture III (SS)
2201524	Arch Drawing & Graphics III (SS)	2201921	Computers Aided Drawing and Graphics
2201525	Surveying & Levelling (SS)		to appear
		2201925	Climatology (SS) **
2201526	Design IV (SV)	2201926	Architectural Design III(SV)
2201527	Building Technology & Materials IV(SV)	2201928	Building Construction & Materials IV (SV)
2201528	Building Technology & Materials IV (PP)	2201927	Building Construction & Materials IV (PP)
2201529	Theory of Structures IV (PP)	2201929	Theory of Structures IV (PP)
2201530	Building Services II (SS)	2201933	Building Services II (SS)
2201531	Building Services II (PP)	2201932	Building Services II (PP)
2201532	History of Architecture III (SS)	2201931	History of Arch. & Culture IV (SS)
2201533	Technical Communication(SS)		to appear
2201534	Working Drawing I (SS)		to appear
		2201900	Environmental Science**
		2201934	Site Survey and Analysis**

THIRD YEAR SEMESTER V and VI			
2015 Pattern		2019 Pattern	
Subject Code	Subject	Subject Code	Subject
3201535	Design V (SV)	3201935	Architectural Design IV (SS)
3201536	Building Technology & Materials V(SV)	3201937	Building Construction & Materials V (SV)
3201537	Building Technology & Materials V (PP)	3201936	Building Construction & Materials V (PP)
3201538	Theory of Structures V	3201938	Theory of Structures V (PP)
3201539	Landscape Architecture I	3201939	Landscape Architecture (SS)
3201540	Building Services III (SS)	3201942	Building Services III (SS)
3201541	Building Services III (PP)	3201941	Building Services III (PP)
3201542	History of Architecture IV (SS)	3201940	Contemporary Architecture Elective I



3201543	Working Drawing II (SS)	3201952	Working Drawing II (SS)
		3201943	Working Drawing I**
3201544	Design VI (SV)	3201944	Architectural Design V (SV)
3201545	Design VI (PP)	3201945	Architectural Design V (PP)
3201546	Building Technology & Materials VI(SV)	3201946	Building Construction & Materials VI (SV)
3201547	Building Technology & Materials VI(PP)		to appear
3201548	Theory of Structures VI (SS)	3201947	Theory of Structures VI (SS)
3201549	Landscape Architecture II (SS)		to appear
3201550	Building Services IV(SS)	3201951	Building Services IV(SS)
3201551	Building Services IV (PP)	3201950	Building Services IV(PP)
3201552	Contemporary Arch Seminar (SS)		to appear
3201553	Elective I (SS)	3201949	Elective II
		3201948	Research in Architecture I**

FOURTH YEAR SEMESTER VII and VIII			
2015 Pattern		2019 Pattern	
Subject Code	Subject	Subject Code	Subject
4201554	Design VII (SV)	4201953	Architectural Design VI (SV)
4201555	Advanced Building Technology and Services I (SV)	4201954	Advanced Building Construction and Services I (SV)
4201556	Professional Practice I (PP)	4201959	Professional Practice (PP)
4201557	Urban Studies I (SS)	4201955	Urban Studies I (SS)
4201558	Research in Architecture I (SS)		to appear
4201559	Quantity Surveying and Estimation I (PP)	4201958	Quantity Surveying & Specification Writing I (PP)
4201560	Specification Writing I (PP)	4201965	Quantity Surveying & Specification Writing II(PP)
4201561	Elective II (SS)	4201957	Elective III
		4201956	Research in Architecture II**
4201562	Design VIII (SV)	4201960	Architectural Design VII (SV)
4201563	Advanced Building Technology and Services II (SV)	4201961	Advanced Building Construction and Services II (SV)
4201564	Professional Practice II (PP)		to appear
4201565	Urban Studies II (SS)	4201962	Urban Studies II (SS)
4201566	Research in Architecture II (SS)	4201966	Project Management**
4201567	Quantity Surveying and Estimation II (PP)		to appear
4201568	Specification Writing II (PP)		to appear
4201569	Elective III (SS)	4201963	Elective IV
		4201964	Elective V**

FIFTH YEAR SEMESTER IX			
2015 Pattern		2019 Pattern	
Subject Code	Subject	Subject Code	Subject
5201570	Practical Training (SV)	5201967	Practical Training (SV)

FIFTH YEAR SEMESTER X			
2015 Pattern		2019 Pattern	
Subject Code	Subject	Subject Code	Subject
5201571	Architectural Design Project (SV)	5201968	Architectural Design Project (SV)
5201572	Elective IV (SS)	5201970	ElectiveVI (SS)
		5201969	Entrepreunership Development**





# SAVITRIBAI PHULE PUNE UNIVERSITY

[Formerly the University of Pune]



## DETAILED SYLLABUS OF FIRST YEAR B.ARCH

### SEMESTER I AND II

**FIVE YEAR DEGREE COURSE IN ARCHITECTURE**

**TO BE IMPLEMENTED FROM 2019-20**

**BOARD OF STUDIES IN ARCHITECTURE  
FACULTY OF SCIENCE AND TECHNOLOGY**



# SEMESTER I

<b>BASIC DESIGN</b>			
Subject Code 1201901[SS]			
TeachingScheme		ExaminationScheme	
TotalContact Hours per week= (lectures=1, Studio=6, Total=7)		Sessional [CIA 125+ EA 125] Viva	250 NIL
		In-semester exam	NIL
		End Semester exam	NIL
		TotalMarks	250
		Total Credits	10

## **COURSE OBJECTIVES:**

- To help students understand the basic elements and principles of design
- To introduce the techniques of creativity, observation skills and to improve sensitivity to surroundings
- To sensitize students to the multi-sensory aspect of space.
- To introduce to various sources of inspiration for creativity

## **COURSE CONTENT:**

The course should cover the following aspects of basic design

1. Study of visual elements of design [such as points, lines, planes, shapes, forms, space, color and texture] and Study of principles of design [such as balance, contrast, scale, proportion, pattern, rhythm and emphasis].
2. Introduction to multi-sensory aspects of space.
3. Techniques to improve creativity [such as brainstorming, matrix of ideas, random combinations, use of manipulative verbs, abstraction, transformation, list of mental associations and use of the ridiculous]
4. Space making through basic elements of design and principles of composition.
5. Role of experience, memory, fantasy, reality, imagination in design.
6. Sources of inspiration such as nature, history, material, climate, geometry, paradox, etc. for creativity.

## **SUBMISSION REQUIREMENT FOR SESSIONAL WORK:**

***There should be minimum eight assignments covering all the above course content to include two dimensional as well three dimensional explorations.***

## **OUTCOME:**

- Creation using elements and principles of design.
- Synthesis of multi-sensory aspects of space.
- Space making.



**RECOMMENDED READINGS:**

- Poetics in Architecture : Theory of Design by Anthony Antoniadis
- Operative Design: A Catalog of Spatial Verbs Paperback – 1 Jul 2013 by Anthony di Mari
- Pattern Language – Christopher Alexander
- The Design of Everyday Things by Donald Norman
- Architecture : Form Space and Order – Francis D. K. Ching
- Interior Spaces : Francis D K. Ching
- Universal Principles of Design by William Lidwell, Kristina Holden, Jim Butler
- Graphic Thinking for Architects and Planners by Paul Lassau
- Tim Brown – Change By Design
- Elements of Space Making – Yatin Pandya

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<b>BUILDING CONSTRUCTION AND MATERIALS I</b>			
Subject Code 1201902 [THEORY] & 1201903 [SV]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=2, Studio=3, Total=5)		Sessional [CIA 25+EA 25]	50
		Viva [INT 25+ EXT 25]	50
		In-semester exam	30
		End Semester exam	70
		Total Marks	200
		Total Credits	07

**COURSE OBJECTIVES:**

- To develop a fundamental understanding of basic building elements, their function and behaviour under various conditions with specific reference to load bearing construction.
- To study the principles of designing components of load bearing structures – foundation, plinth, wall, openings etc. with study of materials suitable for load bearing construction.

**COURSE CONTENT:**

**UNIT I** Introduction to various building elements from foundation to roof and concept of load transfer.

**UNIT II** Introduction to building materials with characteristics, common tests, market forms and Applications.

- 1) Suitable for load bearing construction such as stone, bricks, concrete blocks, soil stabilized blocks, rammed earth construction etc.



2) Lime mortar; cement mortar; various pointing and plastering techniques and their processes

**UNIT III** Strip Foundations suitable for load bearing structures in stone and brick up to plinth level including foundation for steps--Plinth formation, DPC-- Introduction to various tools and equipment commonly used in construction.

**UNIT IV** Load bearing / non load bearing masonry construction using materials such as Stone, bricks, concrete blocks, soil stabilized blocks, rammed earth construction.

**UNIT V** Introduction to openings, spanning of openings by types of arches and lintels, principles and terminology of arch construction spanning of openings using materials mentioned in unit III.

**UNIT VI** Introduction to Bamboo as construction material.

**SUBMISSION REQUIREMENT FOR SESSIONAL WORK:** Hand drawn drawings/Proportionate sketches on Units 4 and 5; Assignments on units 1, 2, 3 and 6 include sketches, notes, market survey and min one model based on unit 4 or unit 5.

**OUTCOME:** Students will develop a basic understanding of the relationship of materials to construction systems, techniques and methodology with specific reference to load bearing construction

**RECOMMENDED READINGS:**

- Dr. B.C Punmia (2012) *Building Construction* (10th edition) Laxmi Publications.
- Harold B.Olin, John L. Schmidt (1994) *Construction principles, Materials and Methods*, John Wiley & Sons, Inc.
- Narayanamurty, D.; Mohan, D (1972) *The use of Bamboo and reeds in building construction* ,UNO Publications
- Roy Chudley, Roger Greeno (2016), *Construction Technology*, 11th Edition Routledge.
- S.C.Rangwala (2013) *Engineering materials* (Fortieth edition),Charotar Publishing pvt.ltd.
- S.K. Duggal( 2016) *Building materials* (4th edition) – New age international publishers.
- Willam Morgan (1977) *The elements of structure: An introduction to the principles of building and structural engineering* Distributed by Sportshelf; 2nd edition
- W.B. Mckay (2015) *Building construction Vol. 1* (5th edition), Vol. 2 (4th edition) and Vol. 3 (5th edition).
- Bureau of Indian standards - Handbook on Masonry Design and Construction (First Revision);National Building Code of India 2016 (Volume 1) and I.S.I. Specifications

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<b>THEORY OF STUCTURES I</b>			
Subject Code 1201904 [THEORY]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=2, Total=2)		Sessional Viva	NIL
		In-semester exam	30
		End Semester exam	70
		Total Marks	100
		Total Credits	02

### **COURSE OBJECTIVES:**

- To Introduce Applied Mechanics and Theory of Structures and their significance and application for architects.
- To Understand Different Systems of Forces and their Equilibrium and that a Building is a System of Forces in Equilibrium:

### **COURSE OUTLINE:**

#### **Unit 1: Forces:**

1. **Applied Mechanics, Statics and Dynamics**, Importance of Study: Force, Definition, Effects of Forces, Different Systems of Forces , Principle of Transmissibility and Superposition of Forces: Resolution and Composition of Forces:
2. **Equilibrium of Concurrent and Non Concurrent Forces**. Conditions of Equilibrium for a System of Concurrent Forces, Parallelogram, Polygonal & Triangular Law of Forces: Lami's Theorem: Resultant and Equilibrant of a System of Concurrent Forces: Moment as an Effect of a Force. Couple and Properties of Couple, Varignon's Principle, Conditions of Equilibrium for a System of Non-Concurrent Forces
3. **Introducing Dead Loads and Live Loads:** Live Loads as concept only. Calculating Total Dead Loads of Walls Slabs etc. from densities.

#### **Unit 2: Simple Stresses and Strains:**

1. Linear Stresses and Strains. Hooke's Law. Stress Strain Diagram for Various Materials. Lateral Strain, Poisson's Ratio: Volumetric Strain, and Bulk Modulus. Shear Stress. Modulus of Rigidity. Relationship between various Moduli. Elastic, Plastic Brittle and Ductile Behaviour. Composite Materials,  
Modular Ratio and Equivalent Area e.g. R.C.C Column with Steel Reinforcement:

#### **Unit 3: Transfer of Load:**

1. Understanding of Transfer of load in a Load bearing Structure and Framed Structure with essential differences. Basic Principles and care to be taken in Load Bearing Structures: Include principles of Earthquake resistant structures with respect to load bearing structures. Introducing Soil Bearing Capacity



#### **Unit 4: C.G and M.I:**

1. Concept of C.G and M.I: Formula only of C.G and M.I for rectangular, Triangular, Circular and Semi Circular Shapes. Parallel Axis Theorem and Radius of Gyration: Formula for Radius of Gyration of a Rectangular Shape

#### **Unit 5: Supports and Loads:**

1. Supports, Definition, Reactions offered by Simple, Fixed, Hinged and Roller Support.
2. Statically Indeterminate and Determinate Structures and Degree of Indeterminacy. Beams classified as Simply Supported, Cantilever, Over Hanging, Propped Cantilever, Fixed and Continuous:
3. Loads Classified as U.D.L, Point Load & Varying Load.
4. Loads Classified as Dead, Live, Wind, Snow, Seismic.
5. **Understanding Reactions for 5 Standard Cases:**
  1. Simple Supported Beam with full U.D.L
  2. Simple Supported Beam with Central Point Load
  3. Simple Supported Beam with Eccentric point Load
  4. Cantilevered Beam with Full U.D.L
  5. Cantilevered Beam with End Point Load

#### **Unit 6: S.F.D and B.M.D of Simple Supported Beams Only:**

1. Definitions of Shear Force and Bending Moment, Point of Zero Shear, S.F max and B.M max, Relationship Between S.F.D and B.M.D
2. S.F.D and B.M.D of 5 Standard Cases as in Point 6 of Unit 5:

#### **NUMERICAL PROBLEMS TO BE SET AS PER FOLLOWING**

1. Calculating Resultant, Equilibrant of a system of Concurrent Forces, and of individual force to get a system of forces into equilibrium. Problems to be limited to 4 forces only, Problems on Parallelogram law of Forces and Lami's Theorem. Problems on Resultant of a system of noncurrent forces as a system of forces in a linear horizontal member/beam only (Points of applications are along or perpendicular to the Beam Axis).
2. Calculating Stress, Strain, Change in Length, Young's Modulus, Stress and change in length for members connected along an axis and in equilibrium due to loads at various points on the axis, Calculating Stress and Load taken by individual materials in a composite Material. Bulk Modulus or Shear Modulus problems kept out of the scope of this syllabus.
3. Calculating width of strip Foundations for given load of super structure.
4. Calculating C.G and M.I to be limited to C, L, T and I Sections only: Also of Symmetrical Rectangular Shapes with Symmetrical Circular cut-outs. M.I of Rectangular Shape about Axis passing through base:
5. Support Reactions for Simply Supported Beams and Cantilevered Beams only (No Overhanging Beams or Inclined Roller Support). Loading to be of U.D.L always with one or two point loads. Problem on calculating dead loads and hence reactions on a beam either simple supported or cantilever beam
6. S.F.D and B.M.D of Simple Supported Beam only with full U.D.L and one or two point loads.



**Course Outcome:** At the end of semester student develops

- The understanding of building/structure as a system of forces and transfer of forces/load from roof to foundation and soil.
- The understanding of various loads acting on a structure
- The understanding of behaviour of elements like walls, beams and columns subjected to tension, compression, shear and bending.

**Reference Books**

1. Mechanics of Structures Volume 1 and 2 by Dr. H.J.Shah and S.B.Junnarkar
2. Strength of Materials by A.P.Dongre
3. Basic Structures by Phillip Garrison
4. Architectural Engineering Design by Robert Brown Butler
5. Vector Mechanics by Beer and Johnston
6. Applied Mechanics by R.S.Khurmi and N.Khurmi

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<b>ARCHITECTURAL GRAPHICS AND DRAWING I</b>			
Subject Code 1201905 [SS]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=1, Studio=4, Total=5)		Sessional [CIA 50+EA50]	100
		Viva	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	100
		Total Credits	03

**COURSE OBJECTIVES:**

- To introduce students to Architectural Graphics and drawing techniques and aspects of scale, annotations etc.
- To enable students to express simple three dimensional objects and building components Through Technical Drawings, using various graphic projection systems such as orthography, Isometric, Axonometric projections and cut sections.
- To introduce various techniques of sketching for recording, studying and communicating objects, buildings and spaces.

**COURSE CONTENT :**

**Unit 1**

- Introduction to Graphics elements (point , line, plane) and concept of scale.
- Introduction to various drawing instruments and methods of employing them for technical drawing and sketching.



## **Unit 2 -Introduction to technical architectural drawing and its components:**

- Various Line types: meaning and application.
- Architectural Lettering and dimensioning techniques.
- Architectural annotations and conventions including representation of various building materials and building components.
- Various Standard and Graphic scales and their application.

## **Unit 3 Plane (two dimensional) and Solid (three dimensional) geometry:**

- Introduction to graphical construction of various plane geometrical shapes and their relevance in Architectural Drawings.
- Introduction to various simple/ Euclidian Three Dimensional Solids 's and their generations

## **Unit 4 Projection Systems in Drawings and graphics**

- Introduction to various projection systems used in Architectural drawing; such as Orthographic, Isometric and Axonometric projections to draw and represent various three dimensional Geometrical solid and hollow objects.
- Introduction to importance, meaning and drawing Section/s of various solid and hollow objects including building components

## **Unit 5 Scale Drawing**

- Introduction to Architectural drawings such as Plans, Sections and Elevations of Building using techniques and skills learnt so far.

## **Unit 6 Sketching:**

- Introduction to architectural sketching using various grades of graphite pencil.
- Principles of free hand sketching such as proportions, with primary thrust on sketching of building elements and built environment (indoor and outdoor).

## **SUBMISSION REQUIREMENT FOR SESSIONAL WORK :**

Minimum eight of Manually drafted A1 size drawings covering units 2 to 5. For unit 6 a sketch book has to be maintained with atleast 15 sketches of various types mentioned in unit 6.

## **COURSE OUTCOME:**

- Students at the end of the Semester should be able to comprehend and express nuances of graphic language through various methods learnt.
- Students should be able to communicate various ideas through Architectural Graphic representations including building plans and sections (drafting and sketching).







Unit 6: Introduction to the traditional Architecture of India with a focus on Maharashtra.

**Sessional Work:**

- A3 size sheets with sketches- preferably plans and sections- of various buildings discussed in the above units. A minimum of two sheets per unit are required. Minimum twenty buildings should be represented in the sheets across the semester.
- One tutorial.

**Course Specific Outcomes:**

1. An understanding of architecture, including settlements, landscapes and buildings as a cultural product shaped by various factors.
2. An understanding of the formal, structural, and stylistic aspects of architectural development.

**Recommended Readings:**

- Brown, P. (n.d.). Indian Architecture: Buddhist and Hindu. Delhi: Kiran Book Agency.
- Ching, F. D., Jarzombek, M., & Prakash, V. (2011). A Global History of Architecture. New Jersey: John Wiley and Sons Inc.
- Dehejia, V. (1997). Indian Art. London: Phaidon.
- Desai, M. (2018). Wooden Architecture of Kerala. Ahmedabad: Mapin.
- Dhongde, S. R., & Ranade, J. (2009). Aurangabad: Culture, Art, Architecture. Aurangabad: INTACH Aurangabad Chapter.
- Fergusson, J. (1891). History of Indian and eastern Architecture. London: John Murray.
- Jain, K., & Jain, M. (2000). Architecture of the Indian Desert. Ahmedabad: AADI Centre.
- Jain, S. (2004). Havelis: A Living Tradition of Rajasthan. Delhi: Shubhi Publications.
- Joshi, O. P. (2010). Tribal Architecture in India. Ahmedabad: Tribal Research and Training Institute.
- Juneja, M. (2008). Architecture in Medieval India. Delhi: Permanent Black.
- Kanhere, G. K. (1989). Temples of Maharashtra. Mumbai: Maharashtra Rajya Sahitya va Sanskriti Mandal.
- Kanhere, G. K. (2013). Temples, Wadas, and Institutions of Pune: A Legacy and Symbolism in Architecture. Pune: BNCA Publication Cell.
- Kolkman, R., & Blackburn S. (2014). Tribal Architecture in Northeast India. Leiden: Brill.
- Mate, M. S. (2008). Maratheshahi Vastushilpa. Pune: Continental Prakashan.
- Pandya, Y. (2013). Concepts of Space in Traditional Indian Architecture. Ahmedabad: Mapin Publishing.
- Pramar, V.S. (2005). A Social History of Indian Architecture. Delhi: Oxford University Press.
- Pramar, V.S. (1989). Haveli: Wooden Houses and Mansions of Gujarat. Ahmedabad: Mapin.
- Tadgell, C. (1994). The History of Architecture in India. London: Phaidon.
- Taschen, A. (Ed.). (2003). Indian Interiors. Berlin: Taschen.
- Taschen, A. (Ed.). (2008). Indian Style. Berlin: Taschen.

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<b>COMMUNICATION SKILLS</b>			
Subject Code 1201907 [SS]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=2, Studio=1, Total=3)		Sessional [CIA 25+ EA 25]	50
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

### Communication Skills

**Objectives:** To enhance skills required for effective communication in Architectural education and practice.

### Course Content

**Unit 1:** Introduction to the various modes of communication and their significance.

**Unit 2 :** **Written communication:** Paraphrasing, Grammar and punctuation. Developing vocabulary pertaining to architecture and design through reading. Introduction to technical writing and forms of writing in architecture discipline such as site visit report, letters, tour reports, appraisals, email etc.. Expressing ideas and concepts through words.

**Unit 2:** **Verbal communication:** Presenting an idea/ thought, debate, group discussion. And **Nonverbal aspects of communication** such as body language, posture, stance etc.

**Unit 3:** **Graphical communication:** Analytical diagrams, info graphics, flow charts, mind maps, posters, logo design.

**Unit 4:** Use of **Digital tools for communication:** Basics of Word based, numerical based software, and visual presentation techniques such as photography, videography etc.

**Sessional work:** Minimum 6 assignments to cover the aspects mentioned above. Assignments may be tied up with other subjects in the syllabus, wherever relevant. Assignments to be framed focusing on the profession of architecture.

**OUTCOME :** At the end of the course the student should be able to communicate fluently in English language and also use tools of communication such as written and graphical for effective communication.

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<b>WORKSHOP I</b>			
Subject Code 1201908 [SS]			
Teaching Scheme		Examination Scheme	
TotalContact Hours per week= (lectures=1, Studio=2, Total=3)		Sessional [CIA 50+EA50]	100
		Viva	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		TotalMarks	100
		Total Credits	02

### **COURSE OBJECTIVES:**

- To Introduce students to the Significance of Model making in Architecture in exploring and representing Massing, form of buildings and spaces
- Introduce to various basic model making techniques and materials their relationship.

### **COURSE CONTENT :**

- Introduction to Importance of Model making in process and communication of Architectural design.
- Introduction to various materials (such as various paper, boards, foam board, wood, etc.) tools and techniques of architectural model making through construction of simple three dimensional objects and simple building models.

*It is expected that the limitations and advantage of all the materials is explained by demonstration/presentation.*

*Models should preferably be co-ordinated with other subjects in the curriculum.*

### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK :**

Minimum six assignments, with thrust on exploring at least three materials and techniques, understanding their appropriateness for the purpose.

### **OUTCOME:**

Students at the end of Semester should be able to understand relevance of model making both in the process of design and as a Product

### **RECOMMENDED READINGS :**

- John Taylor, Model Building for Architects and Engineers
- Rolf Janke, Architectural Models

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## SEMESTER II

<b>ARCHITECTURAL DESIGN I</b>			
Subject Code 1201909 [SV]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=1, Studio=6, Total=7)		Sessional [CIA100+EA100]	200
		Viva [INT 25+ EXT 25]	50
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	250
		Total Credits	10

### **COURSE OBJECTIVES:**

- To introduce design as a process of decision making.
- To introduce to the aspects of decision making such as anthropometry, climate, form, function, structure and material.
- To understand experiential quality of space.
- To comprehensively understand the role of socio cultural and geographical factors in shaping of rural settlements and architecture.

### **COURSE CONTENT:**

Unit 1 : Study and analysis of small scale built spaces with respect to its context, comfort, function, anthropometrical data and layout

Unit 2 : Designing of single activity space like a seating area in public space, kiosks, play area, entrance gate etc. demonstrating the application of the design principles and communicated effectively through two and three-dimensional hand drawings, sketches and models.

Unit 3 : Study and analysis of a rural settlement and architecture with respect to lifestyle, climate & social structure etc.

Unit 4 : Designing in the context of the studied settlement.

### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK:**

- Assignments focusing on each of the four units above and to be presented in various mediums like doodles, sketches, diagrams etc in addition to the architectural drawings and models.

### **OUTCOME :**

The student would be able to analyze simple spaces, identify factors affecting their design and be able to design a simple space for human use.



## RECOMMENDED READINGS :

- A Pattern language by Alexander Christopher
- Structure in Nature -Strategy for Design- Peter Pearce
- Patterns in Nature - Peter Streens
- Visual thinking- Arnheim Rudolf
- Architecture: Form Space and order \_ Francis D.K. Ching
- Rybczynski, Witold. *How the other half builds*
- Jan A. Silva and Leslie Fairweather. *A.J. Metric Handbook*
- Michael Pause & Roger H. Clark. *Precedents in Architecture*
- Gail Greet Hannah (2002). *Elements of Design*
- Bernard Rudofsky (1964). *Architecture without Architects: A Short Introduction to non-pedigreed Architecture*
- Ching Francis D.K.(1979). *Form, Space and Order*
- Ching Francis D.K.(.). *A Visual Dictionary of Architecture*
- Christopher Alexander (). *A Pattern Language*
- Christopher Alexander(). *The Timeless Way of Building*
- Robert Summer(). *Design Awareness*
- YatinPandya (). *Elements of Space Making*
- Paul Lassau (). *Graphic Thinking for Architects & Planners*
- Rybczynski, Witold. *How the other half builds*
- Jan A. Silva and Leslie Fairweather. *A.J. Metric Handbook*
- Michael Pause & Roger H. Clark. *Precedents in Architecture*
- *Elements of Design*

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<b>BUILDING CONSTRUCTION AND MATERIALS II</b>			
Subject Code 1201910 [THEORY] & 1201911 [SV]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=2, Studio=3, Total=5)		Sessional [CIA25+EA25]	50
		Viva [INT25+EXT 25]	50
		In-semester exam	30
		End Semester exam	70
		Total Marks	200
		Total Credits	2+5

## COURSE OBJECTIVES:

- To develop a fundamental understanding of basic building elements, their function and behaviour under various conditions with specific reference to Timber construction.
- To study the principles of designing components of Timber Structure – Floor, Roofs ,Door, Windows



## **COURSE CONTENT:**

**UNIT I** Introduction to earthquake, its magnitude and its effects earthquake resistant measures for load bearing construction. Construction of reinforced masonry walls, pillars and lintels; Masonry vaults and domes.

**UNIT II** Introduction to materials with characteristics, common tests, market forms and Applications.

- 1) Timber, timber derivatives and Introduction to various tools and equipment commonly used in carpentry work.
- 2) Roofing materials for small span sloping roofs including Mangalore tiles, sheet roof covering.

**UNIT III** Study of Single and double floor construction for G+1 building; Staircases – terminology and construction in timber.

**UNIT IV** Introduction to timber panelled and flush doors; various types of timber casement windows along with necessary joinery details, finishes required.

**UNIT V** Introduction to timber roof truss, forces in truss members; Construction of various types of roofs for spans up to 6m also king post and queen post truss.

**UNIT VI** Introduction to wooden partition and wall paneling used for interior application along with necessary joinery details, finishes required.

**SUBMISSION REQUIREMENT FOR SESSIONAL WORK:** Hand drawn drawings on Units 4,5 and 6; Assignments on units 1, 2 and 3 include sketches, notes, market survey and min one model based on unit 1,5 or unit 6.

**OUTCOME:** Students will expand a basic knowledge about earth quake, understanding of properties, construction techniques of timber with specific reference to use of timber in superstructure (spanning, framing techniques).

## **RECOMMENDED READINGS:**

- Dr. B.C Punmia (2012) *Building construction* (10<sup>th</sup> edition) Laxmi Publications.
- Harold B.Olin, John L. Schmidt (1994) *Construction principles, Materials and Methods*, John Wiley & Sons, Inc.
- Roy Chudley, Roger Greeno (2016), *Construction Technology*, 11<sup>th</sup> Edition Routledge.
- S.C.Rangwala (2013) *Engineering materials* (Fortieth edition),Charotar Publishing pvt.ltd.
- S.K. Duggal( 2016) *Building materials* (4th edition) – New age international publishers.
- Willam Morgan (1977) *The elements of structure: An introduction to the principles of building and structural engineering* Distributed by Sportshelf; 2<sup>nd</sup> edition.
- W.B. Mckay (2015) *Building construction Vol. 1* (5th edition), Vol. 2 (4th edition) and Vol. 3 (5th edition).



- Bureau of Indian standards - Handbook on Masonry Design and Construction (First Revision); National Building Code of India 2016 (Volume 1) and I.S.I. Specifications.

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<b>THEORY OF STUCTURES II</b>			
Subject Code 1201912 [THEORY]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=2, Total=2)		Sessional Viva	NIL
		In-semester exam	30
		End Semester exam	70
		Total Marks	100
		Total Credits	02

### **COURSE OBJECTIVES:**

- To Study S.F.D and B.M.D of Overhanging Beams
- To Introduce Lattice Constructions
- To Study the Effect of Forces on a Spanning Members
- To Understand Compression Members

### **Unit 1: S.F.D and B.M.D Continued:**

1. Overhanging Beams on Both Side, Point of Contra flexure, Negative B.M, Representative S.F.D and B.M.D for Beam with Full U.D.L

### **Unit 2: Frames and Trusses:**

1. Introduction to Plane Lattice Construction. Applications of Frames and Trusses with B.T Terminology of Rafters, Purlins etc.: Different Geometry of Trusses e.g. Howe Truss, Fink Truss, N Girder: Perfect Frames, Imperfect Frames, Redundant and Deficient Frames: Assumptions in the Solution of Frames: Effect of Horizontal and Vertical Forces on Frames.

### **Unit 3: Effect of Force on Spanning Members:**

#### **A. Bending Stresses:**

1. Assumptions in the Theory of Simple Bending: The Theory of Simple Bending to create Moment of Resistance: Flexural Formula: Stress Distribution across a Section and across the span of the Beam: Moment of Resistance: Section Modulus and how M.R is proportional to square of depth. Why Beams should be deeper than Wider

#### **B. Shear Stresses:**

1. Shear Stress Formula: Stress Distribution across a Rectangular, Circular T, L, I, C Section: Differences between Bending Stress Distribution and Shear Stress Distribution across the Section and across the span: Simplified Formula for Rectangular and Circular Section (Hollow and Solid)

#### **C. Deflection:**

1. Definition of Deflection and Slope: Maximum and Minimum Slope and Deflection for Cases 1,2,4,5 as defined in semester 1. Double Integration Method of Calculating Deflection and Slope: Derive Formula for Deflection max and Slope max for a Simple Supported Beam with full U.d.l. Formula only for the remaining 3 cases( Omit case of Simple Supported Beam with eccentric point load)





#### **Unit 4: Understanding the Failure of Compression Members:**

##### **a. Eccentric Loaded Columns:**

1. Compression Members Subjected to eccentricity of loading about one and both axis. Derivation of Middle third Rule for eccentricity about one axis. Concept of Core or Kernel of a column for eccentricity about both axes. Applying the Middle Third Rule to Brick Pier Foundation.

##### **b. Long Columns: and Short Columns:**

1. Euler's Theory, Assumptions, Euler's Formula and its Limitations leading to Rankine's Theory. Long and Short Columns for different Materials: Various End Conditions and their Effective Lengths.

#### NUMERICAL PROBLEMS TO BE SET AS PER FOLLOWING

1. S.F.D and B.M.D of Over Hanging Beams with over-hang only on one side *with one udl per span and one or two point loads only*
2. Solution of Frames for Simple Supported Frames(with Symmetrical Loading) and Cantilever Frames using Method of Joints and Method of Sections only.
3. Problems based on Flexural Formula and Calculating Stresses at Distances away from the Neutral Axis, Given a section Calculating load or Span or load so that Stresses are not Exceeded.
4. Problems of Shear Stress Calculation for a Rectangular or Circular Section Only
5. Calculating Deflection max and slope max for symmetrically loaded simple supported or cantilever beams by substituting values in the formula and not by double integration
6. Calculating stresses and drawing stress diagrams for Eccentric loading on Compression Members about one axis only:
7. Analytical problems for Euler's Theory and Rankine's Theory. Problems on Rankine's Theory to be based on basic formula and not Rankine's constant.
8. *Note for all Problems: All Problems should be based on realistic material properties and section sizes*

**Course Outcome:** At the end of semester student develops

- The understanding of effect of various forces in terms of various stresses and deflection for various structural members like beams and columns.
- The understanding of truss as lattice construction and structural actions in it's members.

#### **Reference Books**

1. Mechanics of Structures Volume 1 and 2 by Dr. H.J.Shah and S.B.Junnarkar
2. Strength of Materials by A.P.Dongre
3. Basic Structures by Phillip Garrison
4. Architectural Engineering Design by Robert Brown Butler
5. Vector Mechanics by Beer and Johnston
6. Applied Mechanics by R.S.Khurmi and N.Khurmi

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<b>ARCHITECTURAL GRAPHICS AND DRAWING II</b>			
Subject Code 1201913 [SS]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=1, Studio=4, Total=5)		Sessional [CIA50+EA50]	100
		Viva	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	100
		Total Credits	03

### **COURSE OBJECTIVES:**

- To enable the students to understand and express Composite three-Dimensional objects and buildings formed by additive and interpenetrated solids using various graphical projection systems including sections.
- To enable the students to communicate an architectural idea / proposal in a legible and effective manner through perspective projections, use of shades and shadows, and various architectural presentation and rendering techniques.

### **COURSE CONTENT :**

#### **Unit 1 Solid Geometry:**

- Understanding and drawing of composite and complex three dimensional objects including building components formed by addition and/or interpenetration of various objects. .
- Surface Development of various three dimensional objects.
- Orthographic projections of true shapes of sectional planes.

#### **Unit 2 Perspective Drawing:**

- Drawing one-point and two-point perspective of objects and buildings/ building components using various methods including grid method.
- Introduction to concept of bird's eye view, worm's eye view etc

**Unit 3 Sciography:** Principles of Sciography (shades and shadows) for 3-Dimensional objects and buildings on plans, elevation, isometric and perspective.

### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK :**

- Sessional work should be planned to cover all the units mentioned in course outline with thrust on skill development, accuracy and understanding of the topic.
 

Unit -1	4 assignments
Unit 2	3 assignments
Unit 3	3 assignments

### **OUTCOME :**

- Students at the end of the Semester should be able to comprehend and express composite solid geometry through sketches and drawings leading to comprehension of building components.



- Students should be able to communicate various ideas through Architectural Graphic representations including building plans and sections (drafting and sketching).

**RECOMMENDED READINGS :**

1. Ching Francis D.K.: Architectural Graphics
2. Kelsey W. E.: Geometrical & Building Drawing
3. Leslie Martin: Architectural graphics:
4. B. James: Essential of Drafting
5. H. Joseph and Morris: Practical plane and solid geometry
6. Gill Robert: Rendering with pen and ink
7. Burden Ernest: Architectural Delineation

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<b>HISTORY OF ARCHITECTURE AND CULTURE II</b>			
Subject Code 1201914 [SS]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=1, Studio=2, Total=3)		Sessional [CIA25+EA25]	50
		Viva	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	02

**Course Objectives:**

1. To introduce students to the developments in architecture of the Indian sub-continent after 12th century AD as a result of the social, political, and geographical contexts.
2. To study the development of architecture with specific reference to form, technology, and ornament.
3. To gain an integrated understanding of settlements, landscape, and architecture as a manifestation of culture.

**Course Outline:**

Unit 1: Islamic principles of architectural form, ornament, and meaning. Early Islamic architecture and its evolution and development. Architecture under the Delhi Sultanate-Slave, Khalji, Tughlaq, Sayyid, and Lodhi dynasties.

Unit 2: Islamic architecture in Gujarat, Bengal, Malwa.

Unit 3: Mughal architecture and urbanism.

Unit 4: Post- Mughal architecture of India till 19<sup>th</sup> Cent. AD.

Unit 5: Development of architecture in the Deccan since the 12<sup>th</sup> AD.



Unit 6: Architecture of the Peshwa region and Western Maharashtra.

**Sessional Work:**

A3 size sheets with sketches- preferably plans and sections- of various buildings discussed in the above units. A minimum of two sheets per unit are required. Minimum twenty buildings should be represented in the sheets across the semester.

One measured drawing of a vernacular / traditional building from the region of the college. This can be undertaken as group work with identifiable individual contribution not less than 1 A2 sized sheet.

**Course Specific Outcomes:**

1. An understanding of architecture as a cultural product shaped by various factors.
2. An understanding of the formal, structural, and stylistic aspects of architectural development.
3. An understanding of Indian architecture of the twentieth century in the context of its historical precedents.

**Recommended Readings:**

- Asher, C. B. (1992). Architecture of Mughal India. Cambridge: Cambridge University Press.
- Brown, P. (n.d.). Indian Architecture: Islamic. Delhi: Kiran Book Agency.
- Dehejia, V. (1997). Indian Art. London: Phaidon.
- Dhongde, S. R., & Ranade, J. (2009). Aurangabad: Culture, Art, Architecture. Aurangabad: INTACH Aurangabad Chapter.
- Fergusson, J. (1891). History of Indian and eastern Architecture. London: John Murray.
- Juneja, M. (2008). Architecture in Medieval India. Delhi: Permanent Black.
- Koch, E. (2014). Mughal Architecture. New York: Midpoint Trade Books.
- Mate, M. S. (1961). Islamic Architecture of the Deccan. Pune: Deccan College Research Institute.
- Michell, G., & Pasricha, A. (2011). Mughal Architecture and Gardens. Suffolk: Antique Collectors Club.
- Michell, G., & Zebrowski, M. (1999). Architecture and Art of the Deccan Sultanates. Cambridge: Cambridge University Press.
- Sohoni, P. (2018). The Architecture of a Deccan Sultanate. London: I.B.Tauris.
- Tadgell, C. (1994). The History of Architecture in India. London: Phaidon.
- Taschen, A. (Ed.). (2003). Indian Interiors. Berlin: Taschen.
- Taschen, A. (Ed.). (2008). Indian Style. Berlin: Taschen.
- Tillotson, G. (1999). The Rajput Palaces. Delhi: Oxford University Press.

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<b>FUNDAMENTALS OF ARCHITECTURE</b>			
Subject Code 1201915 [SS]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=2, Studio=1, Total=3)		Sessional [CIA25+EA25]	50
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

## **COURSE OBJECTIVES**

To introduce the students to the field of architecture ,its scope and fundamentals

## **COURSE OUTLINE :**

Unit 1 : Introduction to the profession of Architecture and its distinguishing characteristics with respect to other professions.

Unit 2 : Scope of architecture as a discipline

Unit 3 : Fundamentals of architecture -function , structure ,culture and environment and their integration into the architectural form

Unit 4 : Factors affecting architectural design- site, context , function, circulation, structural system, materials ,sustainability and aesthetics.

Unit 5 : Concept of Shelter and introduction to various building typologies and their design concerns

Unit 6: Scope and significance of subjects in architectural curriculum.

## **SESSIONAL WORK :**

A Study journal and tutorial covering all the above mentioned units.  
Appraisal report of any one building typology.

## **RECOMMENDED READINGS :**

1. Structure in Architecture – Heller Robert and SalvadoriMario
2. Design Fundamentals in Architecture –Pramar
3. Architecture : Form, Space and order – Francis D. K.Ching

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<b>WORKSHOP II</b>			
Subject Code 1201916 [SS]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=1, Studio=2, Total=3)		Sessional [CIA 50+ EA 50] VIVA	100 NIL
		In-semester exam	NIL
		End Semester exam	NIL
		TotalMarks	100
		Total Credits	02

### **COURSE OBJECTIVES:**

- To enable students to make Architectural models with various materials during process of Design and Construction studios and as final presentation to express ideas
- Introduction to Digital modeling with basic softwares

### **COURSE CONTENT :**

- Introduction to advanced materials such as balsa wood, polymers/ plastics, cork and the techniques to make Architectural Models
- Introducing computer aided/ Digital 3D Modeling of simple and composite objects as an exploratory tool.

### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK :**

Minimum six number of assignments with thrust on exploring materials & tools (physical as well as digital), understanding their appropriateness for the purpose. At least one of the assignment should be based on the design project and building technology concepts each.

### **OUTCOME :**

Students at the end of Semester should be able demonstrate sufficient skills in making architectural models.

### **RECOMMENDED READINGS :**

- John Taylor, Model Building for Architects and Engineers
- Rolf Janke, Architectural Models
- Aidan Chopra, Sketchup-2014 for Dummies

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<b>Architectural Design II</b>		
Course Code	2201917[SV]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=1 Studio=6, Total = 7)	Sessional [CIA 100 + EA 100] Viva [Int 25 + Ext 25]	200  50
	In semester exam	NIL
	End Semester exam	NIL
	TotalMarks	250
	Total Credits	10

### COURSE OBJECTIVE:

To understand Architectural Design as a process generating design brief and taking design decisions based on the following aspects:

- **Socio-Cultural Aspects:** To introduce students to socio-cultural aspects like lifestyle, culture, traditions, and their effect on architectural design etc.
- **Aesthetics:** To understand the Aesthetic aspects of Design (visual and experiential) along with spatial attributes (scale and proportions, volume, texture, light and shadows, etc.) and formal characteristics. (profile, base, corner, termination).
- **Anthropometry & Function:** To address functional aspects of design (activity, use of space, adequacy and efficiency of space for a particular activity, essential adjacencies of spaces, ease and efficiency of circulation, light, ventilation, user-space relationship, vertical connections)
- **Climate:** To understand the Climatic aspects those have a bearing on architectural design and address climatic concerns like adequate light, ventilation, protection from rain, insulation, shading, heat gain, through passive strategies.
- **Building Material and Construction Technology:** To study relevance of various building materials to a project, to get introduced to various expressions of a building material, to introduce a student to the construction technologies relevant to the building materials chosen, to understand the scope and limitations of a building technique to achieve the desired form and space.
- **Building Services:** To understand the spatial and structural implications of basic services involved in building design.
- **Site :** To understand the site and its context, both immediate and wider, in order to enable students to take decisions of zoning, circulation within site, distribution of built and open spaces, activity relationships and adjacencies, and views.
- **Universal Design:** To understand the concept and principles of universal design.
- **Precedent Studies:** To introduce the students to learn from case, referral, live studies - process of observation, analysis, documentation and deriving inferences.



### **COURSE OUTLINE:**

- Project 1 (Major Project) : A dwelling for a single family or clusters of dwellings for multiple families with area 300 sq.m. to 500 sq.m. The project should explicitly address at least 4-5 aspects of the design decision process from those listed above. The project should be designed without the aid of mechanical means for vertical transportation.
- Project 2 (Minor Project): A time bound assignment Short term project focusing specifically on any one of the aspects mentioned in course objectives/ Hands-on Workshop / Exercise based on detailing any one of the components of Project 1 but with separate deliverables in addition to the deliverable of Project 1.

### **SESSIONAL WORK:**

- Project 1 (Major Project): The student must represent the identification of core design aspect, formulation of design approach and development, and the final design outcome through architectural drawings along with representative details of construction. Along with the drawings, the student must develop the design through a series of models/ 3D visualizations made at various stages.

Design deliverable for Project 1:

- i. Portfolio A - Architectural drawings and model at an appropriate scale
  - ii. Portfolio B - Process drawings / tracings (Recommended)
  - iii. Study models of various stage (Recommended)
- For Project 2 (Minor Project): The deliverable in case of a time bound assignment or a design exercise should be a portfolio of drawings and / or model. In case of Workshops the deliverable should be a report to be presented on the day of viva.

### **COURSE OUTCOME:**

- At the end of the course the student is equipped to take design decisions by considering various aspects and methodically evolve a design and communicate it in form of 2D and 3D representations.

### **REFERENCE BOOKS :**

1. Antoniadis, A. (1992). The Epic of Gilgamesh: Utility to Metaphor Through the Dawn of Architecture. *IN Epic Space: Towards the Roots of Western Architecture*, 3-18.
2. Sommer, R. (1972). Design awareness.
3. Deasy, C. M. (1974). *Design for human affairs*. Halsted Press.
4. Alexander, C. (1977). *A pattern language: towns, buildings, construction*. Oxford university press.
5. Sealey, A. (1979). *Introduction to building climatology*. Commonwealth Association of Architects.
6. Franck, K. A., Lepori, R. B., & Franck, K. A. (2007). *Architecture from the inside out: from the body, the senses, the site, and the community* (p. 56). London: Wiley-Academy.
7. Salvadori, M. G., & Heller, R. (1963). *Structure in architecture* (No. 624). Prentice-Hall.
8. Pandya, Y. (2005). *Concepts of space in traditional Indian architecture*. Mapin Publishing Pvt.
9. Koenigsberger, O. H. (1975). *Manual of tropical housing & building*. Orient Blackswan.
10. Neufert, E., & Neufert, P. (2012). *Architects' data*. John Wiley & Sons.





11. Chiara, J. D., Panero, J., &Zelnik, M. (1991). *Time-saver standards for interior design and space planning*. McGraw-Hill.
12. Ching, F. D. (2014). *Architecture: Form, space, and order*. John Wiley & Sons.
13. Ching, F. D. (2011). *A visual dictionary of architecture*. John Wiley & Sons.
14. NithyaSrinivasan and KiranVenkatesh., *91 Houses*. InCite
15. Publications by Costford
16. 15a. Laurie Baker. *Brickwork*. Costford
17. 15b. Laurie Baker. *A Manual Of Cost Cuts For Strong Acceptable Housing*. Costford
18. 15c. Laurie Baker. *Houses : How to reduce building costs*. Costford
19. 15d. Laurie Baker. *Mud*. Costford
20. 15e. Laurie Baker. *Rubbish by Baker*. Costford
21. 15f. Laurie Baker. *Earthquake*. Costford
22. 15g. Laurie Baker. *Rural Community buildings*. Costford
23. 15h. Laurie Baker. *Chamoli Earthquake Hand Book*. Costford
24. 15h. Laurie Baker. *Rural House plans*. Costford
25. 15h. Laurie Baker. *Are Slums In-avoidable*. Costford
26. 15h. Laurie Baker. *Alleppey : Venice of the East*. Costford
27. 15h. Laurie Baker. *Rainwater Harvesting*. Costford
28. Arvind Krishnan, (2001) *Climate Responsive architecture*.Tata McGraw Hill
29. It is strongly recommended that students are exposed on the books on works of Master architects

<b>Building Construction and Materials III</b>		
Course Code	2201918 [P]& 2201919 [SV]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=3, Total = 5)	Sessional [CIA 25 + EA 25]	50
	Viva [Int 25 + Ext 25]	50
	In semester exam	30
	End Semester exam	70
	TotalMarks	200
	Total Credits	07

### **COURSE OBJECTIVES:**

- To introduce students to soil study, its relevance to foundation.
- To introduce students to different building materials related to RCC construction.
- To understand basic principles of RCC construction w.r.t. smaller spans.

### **COURSE CONTENT:**

#### **UNIT I**

- Introduction to Soil study &Foundation - Study of different types of soils and their bearing capacities; Concept of bulb of pressure and its significance for site investigation, Introduction to methods of site and strata investigation



- Introduction to different types of shallow foundations and footings and their application in construction

## **UNIT II:** Reinforced Cement Concrete

- Cement: Composition of cement, properties, grades of cement & various types of cement and their uses
- Introduction to concrete as a material--Study of its ingredients viz. binding material, fine aggregate, coarse aggregate and water cement ratio, storage of materials on site, understanding good quality material; field & lab tests involved
- Various concrete mixes and their application in construction, and workability of concrete, Various types of cement concrete, the properties and application, additives and admixtures used in concrete
- Concreting: form work for concreting, mixing, transporting and placing, consolidating and curing of concrete.
- Reinforcement ---steel, grades of steel and steel-mesh reinforcement; along with role of reinforcement in RCC.
- Introduction to the concept of Precast Concrete.

## **UNIT III** Reinforced Cement Concrete Construction upto plinth

- RCC frame structure for smaller spans generally applicable to residential structures, along with earthquake resistant features, reference of a RCC drawing
- R.C.C structural details up to plinth viz. footings, external and internal plinth beams, with plinth formation, with details for toilet block at plinth level.

## **UNIT IV** Reinforced Cement Concrete Construction in superstructure

- Construction of columns, beams for various types of end conditions
- R.C.C floor slab details, viz. one-way, two-way slabs with different end conditions, column-beam-slab junction with details for toilet block, also lintel & weather-shed

## **UNIT V** Windows in non- timber materials

- Study of non-timber windows with materials like Steel-framed, aluminum, UPVC and their construction details.

## **UNIT VI** Flooring & paving materials

- Different flooring & paving types that are cast-in-situ viz. Mud flooring, Brick flooring, Indian Patent Stone finish, Terrazzo flooring etc. and readymade tiles available in market viz. natural stone tiles / slabs, mosaic cement tiles / blocks, ceramic tiles, vitrified tiles and other modern materials, including the process of providing or laying the flooring and pavement
- Floor finishes of various materials viz. carpet, linoleum, rubber, PVC etc.



### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK:**

Hand drafted drawings on Units 3 and 4 to cover all the aspects of course outline in sufficient detail; Assignments on units 1, 2, 5 and 6 to include sketches, notes, market survey. Site visits for unit 3 and 4 should be conducted and presented in report form.

**OUTCOME:** Students will develop a basic understanding of the relationship of materials to construction systems, techniques and methodology with specific reference to reinforce cement concrete construction; an understanding of the concepts of concrete as a building construction material.

### **RECOMMENDED READINGS:**

- Dr. B.C Punmia (2012) Building Construction (10th edition) Laxmi Publications.
- Harold B.Olin, John L. Schmidt (1994) Construction principles, Materials and Methods, John Wiley & Sons, Inc.
- Roy Chudley, Roger Greeno (2016), Construction Technology, 11th Edition Routledge.
- S.C.Rangwala (2013) Engineering materials (Fortieth edition), Charotar Publishing pvt.ltd.
- S.K. Duggal (2016) Building materials (4th edition) – New age international publishers.
- Willam Morgan (1977) The elements of structure: An introduction to the principles of building and structural engineering distributed by Sportshelf; 2nd edition.
- W.B. McKay (2015) Building construction Vol. 1 (5th edition), Vol. 2 (4th edition) and Vol. 3 (5th edition).
- National Building Code of India 2016 (Volume 1) and relevant I.S.I. Specifications.

<b>Theory of Structures IV</b>		
Course Code	2201920[P]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week (lectures=2 Studio=0, Total = 2)		
	In semester exam	30
	End Semester exam	70
	Total Marks	100
	Total Credits	02

### **COURSE OBJECTIVES:**

1. *To Understand Fixity and Continuity. To understand the action of Torsion*
2. *To Understand Loading on Buildings and Different Design Methodologies*
3. *To Understand Wood as a Material, as a Structural Material and to Design Wooden Beams*
4. *To Understand Concrete as a Material and To Design small spanned R.C.C Super Structures*



## **COURSE OUTLINE:**

### **Unit 1: Fixed and Continuous Beams:**

1. Fixed Beam as a statically indeterminate structure. Concept of Negative Bending Moment at supports. Advantages and Disadvantages over Simple Supported Beams. Fixed End Reactions for u.d.l, central and eccentric point load (No derivations). Simple Numerical with full u.d.l and one central point load or one eccentric point Load
2. Theory only of Continuous Beams. Concept of continuity over supports and Typical B.M.D to explain the negative B.M.D over supports using I.S.456 coefficients for 3 or more, more or less equal spans. Enlist methods for computing B.M.D. Advantages and Disadvantages over Simple Supported Beams.
3. Theory only to Introduce Torsion and its applications.

### **Unit 2a: Loading on Buildings and Design Methodologies:**

1. Theory only of Listing of all Loads acting on a Structure in single line Definitions. Study of Live Load (as per I.S.875 Part 2), Dead Load, Wind Load and Seismic Load and Snow Load in Detail
2. Theory only of Various Design Methodologies in Brief. Study of **Working Stress Method** in Detail. Understanding the application of Factors of Safety. Advantages and Dis-advantages of W.S.M compared to other methods.

### **Unit 2b: Wooden Structures:**

1. Study of Wood as a Material and as a Structural Material, Its Advantages and Dis-advantages. Theory only of Form Factors
2. Numerical on Design of a Primary Wooden Flexural Member (Without Secondary Beams) either as a Simple Supported Beam or a Cantilever, with Simple Loading and depths limited to 300mm. Theory only Framing of Floors using Secondary and Primary Beams

### **Unit 3: Concrete Material and L.S.M:**

1. Theory only of use of I.S.456. To Understand Concrete as a material, its Grades, all the individual constituents, their sizing, proportioning, Production of Concrete. Testing of Concrete w.r.t. listing various tests and studying Slump and Compressive Strength Test in Detail. Form work and Stripping as per I.S.456
2. Theory only of Steel Used in R.C.C, Why steel only, its properties, forms and suitability in various R.C.C elements.
3. Theory only of Limit State Method – Philosophy, Various Limit States and their care in R.C.C. Span to Depth Ratios for Various R.C.C Elements. L.S.M Flexural Diagram for **M25 grade and Fe500 steel**. Derivations of Flexural Formula for Balanced Section. Annotations in a Standard R.C.C Flexural Section like Depth Overall, Depth Effective, Cover and its importance and values as per I.S.456

### **Unit 4: Design of R.C.C Slabs for Small Spans (L.S.M for Flexure only):**

1. Concept of One Way – Two-Way Slab, Importance of Distribution Steel and I.S.Provisions.
2. Numerical on Design of One Way Slab and Design of Two Way Slab



3. Numerical on Design of Cantilever Slab resting on a Beam (Beam Torsion in theory only)
4. Numerical on Design of Small Slabs like Toilet Sunken Slabs with Inverted Beams, Passage Slabs, Chajjas with Minimum Depth, Minimum Area of Steel with minimum/ maximum standards of Spacing.

**Unit 5: Design of Beams (L.S.M for Flexure and Shear):**

1. Numerical on Design of Simple Supported R.C.C Beams including Transfer of Load from Slab to Beam for one way slab only,
2. Theory only for Detailing in for a Beam supporting a Cantilever Porch

**Unit 6: Design of Short R.C.C. Columns (L.S.M for Compression):**

1. Definition of Short R.C.C. Columns. Various I.S.Provisions for Compression Members.Numerical on Design of Short R.C.C. Columns including Transfer of Load from Beam to Column

**Course Outcome:**At the end of semester student develops

1. The understanding of the concepts of Fixity, Continuity and Torque
2. The Skills to Design small spanned Wooden Beams
3. The Skills to Design Small Spanned R.C.C Structure w.r.t Slabs, Beams and Columns and use it for his B.C.M and W.D. subjects

**Reference Books**

1. Design of R.C.C. Structures by H.J.Shah
2. Design of R.C.C. Structures by Punmia and A.K.Jain
3. Design of Reinforced Concrete Structures by N.Krishnaraju
4. R.C.C Theory and Design by Dr. V.L.Shah and Dr.S.R.Karve
5. Strength of Materials by A.P.Dongre
6. Design and Analysis of Steel Structures by V.N.Vazirani. M.M.Ratwani and Vineet Kumar (For Wooden Structures Unit 2b)

<b>Computer Aided Drawing and Graphics</b>			
Subject Code		2201921[SS]	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=3)	04	Sessional [CIA 25 + EA 25]	50
		In semester exam	
		End Semester exam	
		TotalMarks	50
		Total Credits	02

**COURSE OBJECTIVES:**

- To enable the students to communicate an architectural idea / proposal in a legible and effective manner through various architectural presentations and rendering techniques.
- To enable the students to generate simple architectural drawings using **Computer Aided Drawing**
- To enable the students to express their design ideas through various sketching techniques



## COURSE OUTLINE:

### Unit 1 Graphics:

- Introduction to various mediums for architectural presentations in various drawing formats (minimum two mediums)
- It is recommended to work on presentation drawings for any Architectural design project. A set of drawing shall include rendering of Plans, Elevations, Sections with internal and external perspective views.

### Unit 2 Computer Aided Drawing:

- Introduction to basics of Computer Aided Drawing with basic commands for Drawing, sufficient to construct simple geometrical shapes and 3D objects.
- Advance commands in CAD such as Setting Drawing parameters, Layer controls, Hatching, Model and paper space settings etc.
- Drafting single building from Semester II Design on CAD.

## SUBMISSION REQUIREMENT FOR SESSIONAL WORK:

Sessional work should be planned to cover all the units mentioned in course outline with thrust on skill development, accuracy and understanding of the topics.

Unit 1	Demonstration of presentation techniques in various drawing formats (minimum two mediums) to include external perspective and internal perspective of students' own architectural design.	2 assignments [hand drawn]
Unit 2	CAD drawings (Plan, Section/s Elevation/s) with layers, hatch and dimensions from Semester II Design project	2 assignments
	CAD Drawings of orthographic solid objects studied in Semester II	2 assignments

## OUTCOME :

- Students should be able to comprehend and express nuances of graphic language through various presentation techniques and methods learnt.
- Students should be able to communicate various ideas through architectural graphic representations (drafting and sketching).

## RECOMMENDED READING:

Burden, E. E. (1971). *Architectural delineation: a photographic approach to presentation*. McGraw-Hill Companies.

Holmes, J. M. (1954). *Applied perspective;: The theory and application of perspective for architects, painters, and draughtsmen*. s.l.:s.n

Capelle, F. W. (1969). *Professional perspective drawing for architects and engineers*. s.l.:s.n

Schaarwachter, G. (1967). *Perspective for the Architect*. Thames and Hudson.

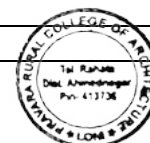
Sha Publishing Co. Ltd.: Interior perspective in Architectural Design- Japan Graphics

Japan Publishing Co: Modern Architectural Rendering best 180

Japan Publishing Co: Perspective Drawings of Modern Architecture

Japan Publishing Co: Air brushing in rendering

Shankar Mulik: Perspective and Sciography



Course Code		2201922[SS]	
Teaching Scheme		ExaminationScheme	
Total Contact Hours per week= (lectures=1, Studio=2, Total=3)		Sessional [CIA 25+EA 25] Viva	50 NIL
		In-semester exam	NIL
		End Semester exam	NIL
		TotalMarks	50
		Total Credits	02

### Course Objectives:

1. To understand the development of European architecture through the historical period till 17<sup>th</sup> century AD.
2. To understand the relationship of religion and society with architecture
3. To understand the drivers of change, revival, and evolution of architecture

### Course Outline:

Unit 1: Greek architecture including Greek temples, domestic architecture, public architecture, city planning, and the Acropolis.

Unit 2: Roman architecture including domestic architecture, public architecture, architecture of the forums, urban planning, structural innovations, forms, materials and techniques of construction.

Unit 3: Early Christian architecture including adaptation of Roman models, early church prototypes, Byzantine architecture

Unit 4: Early medieval manors, monasteries, Romanesque churches

Unit 5: Gothic architecture and developments therein with reference to church plans, structural techniques, and ornamentation, Gothic churches and cathedrals

Unit 6: Renaissance and resultant architecture including works of Andrea Palladio, Michelangelo, Brunelleschi. Works of Sir Christopher Wren and Inigo Jones. Post-Renaissance and Baroque architecture

### Sessional Work:

- Minimum 25 representative buildings of the periods under study should be represented in Plans, sections and views- of various buildings discussed in the above units.
- One measured drawing and digital documentation of any site/ building / or part/features of the building related to the course content studied.. This can be undertaken as group work with identifiable individual contribution.
- One tutorial.



**Course Specific Outcomes:**

1. An understanding of architecture as a product shaped by various factors like religion and society.
2. An understanding of the formal, structural, and stylistic aspects of architectural development.
3. An understanding of the factors that bring about the processes of change in architectural manifestations and its meanings.

**Recommended Readings:**

Anderson, Christy. Renaissance Architecture. Oxford University Press, 2013.

Ching, Francis D K, Mark Jarzombek, Vikramaditya Prakash. A Global History of Architecture. John Wiley and Sons, 2011.

Fletcher, Sir Banister and Dan Cruickshank. Sir Banister Fletcher's A History of Architecture On The Comparative Method. Architectural Press, 1996.

Frankl, Paul. Gothic Architecture. Yale University Press, 2001.

Lawrence, A W. Greek Architecture. Yale University Press, 1957.

Summerson, John. The Classical Language of Architecture. Thames and Hudson, 1980.

Ward-Perkins, J B. Roman Imperial Architecture. Yale University Press, 1992.

<b>Building Services I</b>		
Course Code	2201923 [P] & 2201924 [SS]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week (lectures=2 Studio=2, Total =4)	Sessional [CIA 25 + EA 25]	50
	In semester exam	30
	End Semester exam	70
	Total Marks	150
	Total Credits	03

**COURSE OBJECTIVES:**

To make students understand the Plumbing scope in the MEP services integration. To introduce students to following Plumbing Services in low, medium and high rise buildings and inculcate them the integration of services required in architectural design.

This term aims at following services:

- Systems for hot and cold water supply in a building premises
- Systems for Sewage, Sullage, Storm water & and its disposal within or from building premises.

**COURSE OUTLINE:**

Introduction to sourcing, storage, and distribution of hot and cold water in building premises including the study of all necessary components involved and their installation.





To introduce students to drainage systems viz. collection, conveyance & disposal of sewage, sullage and Effluents from building premises, including methods, components and apparatus involved.

### **UNIT I Water supply - I**

- 1.1 Principles and techniques of supplying water
  - Treatment of water
  - Concept of Pressure head
  - Flow through pipes
- 1.2 Tapping of water mains on street by means of Ferrule
- 1.3 Requirement, Storage and distribution of water in building premises
  - Sizing of Water tanks
  - Static water storage requirements (Fire Tank)
  - Collection and Storage systems
  - Types of Pumps and applications
  - Storage and Distribution in High rise buildings
- 1.4 Pipes and piping network
  - Materials of Pipes
  - Joinery
  - Installation techniques
- 1.5 Various control valves and their applications

### **UNIT II Water supply - II**

- 2.1 Types of Taps, Faucets, Fittings and advanced proprietary systems used in baths, kitchen and WC units.
- 2.2 Provisions, Installations and applications of above.

### **UNIT III Hot Water Supply.**

- 3.1 Systems of hot water supply using conventional and non-conventional energy sources.
  - Instantaneous and Centralized
  - Direct system and In-Direct system
  - Components and Equipment used for the same.
- 3.2 Piping Insulation, safety and special considerations in piping network.
- 3.3 Failures, precautions, and safety measures
- 3.4 Information on other Circulation systems i.e. ring system, up-feed/ down-feed systems, etc. and its application.

### **UNIT IV Drainage-I (Vertical Drainage systems)**

- 4.1 Introduction to various sanitary fittings with necessary knowledge of provisions to be made and their Installations.
  - Sanitary fittings like Wash basins, Sinks, Bathing units, Water Closets (Indian and European), Urinals
  - Selection criteria and variations in Installing and provisions to be made for same
  - Assembling, combining and coordinating them in washing, bathing and WC units
- 4.2 Study of various Traps, with their working and applications.
  - All types of traps and their installation.



4.3 Pipes and piping network. Techniques of Vertical drainage system in shafts, ducts and external face of **low, medium and high rise buildings**.

- Study of service Shafts, Ducts, Floors
- Single and double stack systems with part and full ventilation.
- Pipe materials, their classification and methods of Installation
- Special fittings used for - Jointing and installations.
- Special fittings for High rise buildings (vent system, Expansion chambers, Pressure relief lines, Bypass Socket etc)
- Anti-Syphonic system of ventilation in drainage system

#### **UNIT V Drainage-II (Horizontal Drainage system)**

5.1 Techniques of underground drainage systems for waste water, effluents and sewage. Principle and concept of self-cleansing velocity in flow through pipes. Techniques in laying, leveling, planning, aligning, testing, inspection and maintenance

- Invert levels, Gradients, Access point planning
- Types of Chambers, Sumps, Channels, Shafts, service corridors, catch basins
- Ventilation of drainage system.
- Connection to Main Sewer Drain on Road side

5.2 Rainwater drainage system and surface runoff methods

- Storm water drainage systems.
- Invert levels, Gradients
- Sedimentation tanks and catch basins
- Rainwater harvesting methods

#### **UNIT VI Sewage Treatment and Disposal**

6.1 Disposal within the Premises.

- Septic tanks, its function, types and design (Sizing).
- Maintenance of Septic tank.

6.2 Waste Water and Sewage treatment plant (Large and Compact)

- Introduction to Waste water treatment plant
- Introduction to sewage treatment plant
- Decentralized waste water treatment

6.3 Bio-Gas plant and its functioning

#### **SESSIONAL WORK**

1. Illustrative Sketches of Installations of Bathroom accessories and Sanitary ware showing water inlet connection and Drain provisions
  2. Preparing internal Water supply and Drainage layouts for Residential toilets, Kitchen and Public Toilets
  3. Preparing external water supply and drainage layouts for individual Bungalow with septic tank
  4. Preparing external water supply and drainage of a building site having more than one building on the site and connectivity to City Municipal Supply and Drain
- The drawing assignments to be based upon the theory learnt and supported with necessary drawings and calculations (70% weightage).
  - Visits to construction sites and preparing site visit reports, market survey and finding out latest trends and new materials (30% weightage).



## RECOMMENDED READING

- NBC 2016 Vol 2, Part 9, Sections (1, 2, 3)
- Handbook on Water supply and Drainage - BIS SP 35 1987
- Building Services Handbook - Fred Hall & Roger Greeno
- Sanitation, Drainage and Water Supply - Mitchell.
- IPC 2018 (International Plumbing Code)
- Plumbing – Design & Practise – S G Deolalikar
- Environment and Services - Peter Burberry.

<b>Climatology</b>		
Course Code	2201925 [SS]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week (lectures=1 Studio=2, Total = 3)	Sessional [CIA 25 + EA 25]	50
	In semester exam	
	End Semester exam	
	Total Marks	50
	Total Credits	02

## COURSE OBJECTIVES:

To understand climate as a determinant of architectural design and to enable the students to evolve climate responsive design.

## COURSE OUTLINE

### Unit I:

1. Understanding the Earth-Sun relation and context of what shapes climate.
2. Elements of climate and understanding climate at different scales ie, global, regional, macro and micro.

### Unit II:

1. Global Climate classification
2. Climatic zones of India and its classifications

### Unit III:

1. Introduction to passive design strategies at various scales ie urban, building and building component scale.

### Unit IV:

1. Introduction to concept of Thermal Comfort in buildings.

### Unit V:

1. Introduction to various tools like sun path, bioclimatic chart, site analysis matrix etc that are used to study sun movement, wind and comfort in buildings.



## **SESSIONAL WORK**

- Individual Assignment to apply the various tools like sun path and bioclimatic chart in building element design etc.
  - Group work to study contemporary and vernacular architectural case studies in India with climate responsive architecture and passive design strategies.
  - Minimum two tutorials on all the units.
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<b>Architectural Design III</b>		
Course Code	2201926 [SV]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=1 Studio=6, Total = 7)	Sessional [CIA 100 + EA 100] Viva [Int 25 + Ext 25]	200 50
	In semester exam	NIL
	End Semester exam	NIL
	TotalMarks	250
	Total Credits	10

### COURSE OBJECTIVE:

To understand Architectural Design as a process of generating design brief and taking design decisions based on the following aspects:

- **Socio-Cultural Aspects:** To introduce students to socio-cultural aspects like lifestyle, culture, traditions, and their effect on architectural design etc.
- **Aesthetics:** To understand the Aesthetic aspects of Design (visual and experiential) along with spatial attributes (scale and proportions, volume, texture, light and shadows, etc.) and formal characteristics. (profile, base, corner, termination).
- **Anthropometry & Function:** To address functional aspects of design (activity, use of space, adequacy and efficiency of space for a particular activity, essential adjacencies of spaces, ease and efficiency of circulation, light, ventilation, user-space relationship, vertical connections)
- **Climate:** To understand the Climatic aspects those have a bearing on architectural design and address climatic concerns like adequate light, ventilation, protection from rain, insulation, shading, heat gain, through passive strategies.
- **Building Material and Construction Technology:** To study relevance of various building materials to a project, to get introduced to various expressions of a building material, to introduce a student to the construction technologies relevant to the building materials chosen, to understand the scope and limitations of a building technique to achieve the desired form and space.
- **Building Services:** To understand the spatial and structural implications of basic services involved in building design.
- **Site :** To understand the site and its context, both immediate and wider, in order to enable students to take decisions of zoning, circulation within site, distribution of built and open spaces, activity relationships and adjacencies, and views.
- **Universal Design:** To understand the concept and principles of universal design.
- **Precedent Studies:** To introduce the students to learn from case, referral, live studies - process of observation, analysis, documentation and deriving inferences.



## COURSE OUTLINE:

- **Project 1 (Major Project):** A design project that introduces the concept of site planning with multiple built spaces with an area 1000 sq.m. to 1500 sq.m.. This project should house a variety of core and allied activities requiring built, open, and transition spaces. The project should explicitly address at least four aspects of the design decision variables from those listed in course objectives.
- **Project 2 (Minor Project):** The students must undergo a Settlement study / study tour in a region with which is different in terms of socio geographic characteristics than the place where the institute is located. A short term project or eskee based in the settlement the students have studied.

## SESSIONAL WORK:

- **Project 1 (Major Project):** The student must represent the identification of core design aspect, formulation of design approach and development, and the final design outcome through architectural drawings along with a narrative and representative details of construction. Along with the drawings, the student must develop the design through a series of models/ 3D visualizations made at various stages.  
Design deliverables -
  - i. Portfolio A - Architectural drawings and model at an appropriate scale
  - ii. Portfolio B - Process drawings / tracings (Recommended)
  - iii. Study models of various stage (Recommended)
- **Project 2 (Minor Project):** The Study Tour documentation covering details from whole to part and must include narratives, sketches, scale drawings, photographs. It may additionally have information presented in any other formats in addition to the ones mentioned above. The short term project or eskeeto be presented in form of drawings to explain the scheme.

## COURSE OUTCOME :

- At the end of the course the student is equipped to take design decisions by considering various aspects and methodically evolve a design where two or more buildings are to be planned on a site and communicate it in form of 2D and 3D representations.

## REFERENCE BOOKS

2. Lynch, K., Lynch, K. R., & Hack, G. (1984). *Site planning*. MIT press.
3. Rybczynski W. (1984). *How the Other half builds, Volume 1 : Space*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
4. Carlos Barquin (1986). *How the Other half builds, Volume 2 : Plots*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
5. Vikram Bhatt. (1990). *How the Other half build, Volume 3 : Self selection Process*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
6. Rapoport, A. (1969). *House form and Cultua*. Prentice-Hall of India Private Ltd.: New Delhi, India.
7. Correa, C. (2010). *A place in the shade: the new landscape & other essays*. Penguin Books India.



8. Dave, B., Thakkar, J., Shah, M., & Hāṇḍā, O. (2013). *Prathaa: Kath-khuni Architecture of Himachal Pradesh*. SID Research Cell, School of Interiour Design, CEPT University.
9. Kanvinde, A., & Miller, H. J. (1969). *Campus design in India: experience of a developing nation*. Jostens/American Yearbook Company.
10. Adler, D. (2007). *Metric handbook*. Routledge
11. Neufert, E., & Neufert, P. (2012). *Architects' data*. John Wiley & Sons.
12. Gropius, W. (1956). *Scope of total architecture*. London: G. Allen & Unwin.
13. Giedion, S. (1967). *Space, time and architecture: the growth of a new tradition*. Harvard University Press.
14. Gibbered, Fredrick: *Town Design*.
15. David Gosling, Gordon Cullen – *Visions of Urban Design*.
16. Bawa, G., & Robson, D. (2002). *Geoffrey Bawa: the complete works*. Thames & Hudson.
17. Scheer, B. C. (2017). *The evolution of urban form: Typology for planners and architects*. Routledge.
18. It is strongly recommended that students are exposed on the books on works of Master architects

<b>Building Construction and Materials IV</b>		
Course Code	2201927 [P]& 2201928 [SV]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week (lectures=2 Studio=3, Total = 5)	Sessional [CIA 25 + EA 25]	50
	Viva [Int 25 + Ext 25]	50
	In semester exam	30
	End Semester exam	70
	Total Marks	200
	Total Credits	07

### **COURSE OBJECTIVES:**

- To understand basic principles of RCC construction w.r.t. Cantilever slabs, Staircase.
- To introduce students to vertical transportation systems.

### **COURSE CONTENT:**

#### **UNIT I Cement Concrete types**

- Types of special concretes, to include lightweight concrete, ready-mixed concrete, ferro-cement etc; study of its ingredients viz. along with storage of materials on site, understanding good quality material and field & lab tests involved.

#### **UNIT II Damp- & Water-Proofing**

- Causes of dampness and reasons for damp- & water-proofing, Different methods or treatments of damp- & water-proofing brick on edge, rough Shahabad stone, bitumen sheets,



plastic sheets, epoxy resins and metallic water proofing materials and other proprietary materials application of the above in construction for terraces, chhajja, toilet slabs etc.

### **UNIT III Reinforced Cement Concrete Construction**

- R.C.C structural details for balcony slabs, canopies and Construction of various types of pre-cast and in-situ RCC stairs, along with earthquake resistant features, reference of a RCC drawing

### **UNIT IV Vertical Transportation: Lifts, Escalators & Conveyors**

- Study of elevators, escalators, conveyors – types, size, capacity, speed and Mechanical safety methods, provisions in civil work for installation of elevators and escalators

### **UNIT V Sliding & Sliding folding doors, Bay window**

- Study of Various types of sliding and folding doors and
- Construction of Bay Window

### **UNIT VI Glass, Plastics**

- Glass as a building material, brief history of its use through examples. Manufacture, properties and uses of glass. Various types of glass and its application in building construction
- Plastic as a building material; its properties, types, uses and application of plastics in building industry.
- Different types of adhesives and sealants used in building construction

### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK:**

- Hand drafted drawings on Units 3 and 5 to cover all the aspects of course outline in sufficient detail;; Assignments on units 1, 2, 4 and 6 include sketches, notes, market survey and site visits.

### **OUTCOME:**

- Students will develop an understanding about concrete and its variants and artificial materials such as glass and plastic and their application in construction. Students will be developing knowledge about the vertical transportation systems and their design and construction requirement.

### **RECOMMENDED READINGS:**

- Dr. B.C Punmia (2012) Building construction (10th edition) Laxmi Publications.
- Harold B.Olin, John L. Schmidt (1994) Construction principles, Materials and Methods, John Wiley & Sons, Inc.
- Roy Chudley, Roger Greeno (2016), Construction Technology, 11th Edition Routledge.
- S.C.Rangwala (2013) Engineering materials (Fortieth edition),Charotar Publishing pvt.ltd.
- S.K. Duggal (2016) Building materials (4th edition) – New age international publishers.





- Willam Morgan (1977) The elements of structure: An introduction to the principles of building and structural engineering Distributed by Sportshelf; 2nd edition.
- W.B. Mckay (2015) Building construction Vol. 1 (5th edition), Vol. 2 (4th edition) and Vol. 3 (5th edition).
- Central Public works Department CPWD), IBC, CEAI & CCPS. Guidelines on use of Glass in Buildings - Human Safety.
- National Building Code of India 2016 (Volume 1) and relevant I.S.I. Specifications.

<b>Theory of Structures IV</b>		
Course Code	2201929 [P]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=0, Total = 2)	In semester exam	30
	End Semester exam	70
	TotalMarks	100
	Total Credits	02

#### **COURSE OBJECTIVES:**

1. To continue the study of Design of Various Elements of a R.C.C Super Structure.
2. To Study Steel as a Material and get Introduced to various Steel Sections and their appropriate Use
3. To Design Girders and Stanchions in L.S.M as per I.S.800-2007

#### **Unit 1: Design of R.C.C Slabs Continued:**

1. Theory only of Different ways of supporting a Balcony
2. Numerical of Design of a Cantilever Slab as an Overhanging Slab

#### **Unit 2: R.C.C Beams Continued:**

1. Numerical of Design of Cantilever Beams to support Balcony Slabs
2. Concept of Under Reinforced, Balanced and Over Reinforced Sections. Numerical on Analysis of a Given Beam with Strain Diagrams
3. Audit of a Load Bearing Structure for various Structural and Non-Structural Elements

#### **Unit 3: Design of R.C.C Slabs Continued:**

1. Numerical of Design of Dog Legged Staircase with Beams at Various Positions:
2. Theory only on Support Systems and Reinforcement Detailing in the following Cases
  - Stringer Beams - End Stringer Beams with S.S Slabs Treads.
  - Stringer Beams - Central Stringer Beams with cantilever Slab Treads.
  - Folded Plate Staircases.



- Open Well Staircases.
- Dog-legged Staircase with Various Beam Positions.
- Numerical of Design of One Way Continuous Slabs - 3 equal spans using I.S.456 Coefficients.

#### **Unit 4: Introduction to Steel Structures:**

1. Theory only of Elements of Steel Structures - Steel Framed Multiple Floors and Buildings with Trusses.
2. Standard Lay Out of Factory or Trussed Buildings in Plan and Section. Plan to include Store Areas, Loading Platforms. Section to Include Cladding.
3. Study of Steel as a Material and Use E250 Steel as Structural Steel. Reading of Steel Tables. Different Structural Steel Sections. Identifying the Sections to be used for Girders, Stanchions, Compound Stanchions, and Struts etc.

#### **Unit 5: Design of Steel Structures:**

1. Theory only L.S.M or Plastic Design in steel - Various Limit States, Prevention of Dis-Proportionate Collapse, Development of Plastic Hinges, Plastic Moment, Section Modulus Plastic, Plastic Neutral Axis and Shape Factor, Various Partial Factors of Safety, All as per I.S.800 2007
2. Numerical of Design of Small Span Girders for Lofts and Balconies and Large Spans for creating Floors in Industrial Buildings, including Classification of Sections into Plastic, Compact and Semi Compact.
3. Numerical of Design of Stanchions. Theory only of connections to Girders to Stanchions and Stanchions to Base Pads.

**Course Outcome:** *At the end of course student develops*

1. *The understanding of supporting Balconies and Staircases*
2. *The Understanding of Dividing Larger Rooms in Smaller One Way or Two Way Slab Units*
3. *The Understanding of Steel as a Material and Various Steel Sections and their use.*
4. *The understanding of using Steel Girders and Stanchions*

#### **Reference Books**

1. Design of R.C.C. Structures by H.J.Shah
2. Design of R.C.C. Structures by Punmia and A.K.Jain
3. Design of Reinforced Concrete Structures by N.Krishnaraju
4. R.C.C Theory and Design by Dr. V.L.Shah and Dr.S.R.Karve
5. L.S.Design of Steel Structures by S.K.Duggal
6. Design of Steel Structures By Limit State Method as per I.S.800- 2007 By S.S.Bhavikatti



<b>Environmental Science</b>		
Course Code	2201930 [SS]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=1 Studio=2, Total = 3)	Sessional [CIA 25 + EA 25]	50
	In semester exam	-
	End Semester exam	-
	TotalMarks	50
	Total Credits	02

### **COURSE OBJECTIVES:**

Basic introduction to Multidisciplinary nature of environmental studies with focus on

- Natural Resources
- Eco Systems
- Biodiversity and its conservation
- Environmental Pollution
- Environment Legislation and Social aspects of environment
- Environment friendly buildings

### **COURSE CONTENT:**

**Unit I** –Natural Resources-Land, water, forest, energy and food

**Unit II -Concept of Eco Systems with structure and functions**

- Biochemical cycles
- Different ecosystems such as forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystems (ponds, lakes, streams, rivers, estuaries, oceans)

**Unit III -Biodiversity**

- Value of biodiversity: consumptive, productive use, social, ethical and aesthetic
- Treats to biodiversity and conservation of biodiversity(in-situ and ex-situ)

**Unit IV - Environmental Pollution**

- Causes, effects and control measures of air pollution, water pollution, soil pollution, marine pollution noise pollution, thermal pollution and nuclear hazards

**Unit IV –Environment Legislation and Social aspects of environment**



- Basic Introduction to Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act and Forest Conservation Act
- Environment and human health, human rights and value education for environmental awareness
- Basic introduction to Environment clearance for construction projects
- Brief introduction to the concept of “green buildings” and green building rating systems.

**SUBMISSION REQUIREMENT FOR SESSIONAL WORK:**

- Journal on each unit with basic concept, definitions and case studies
- Seminar/essay on any one current environmental issue and its interconnectedness with architecture/development

**OUTCOME:**

Students should be able to grasp the interdisciplinary nature of environment science and its interdependence on development and society. They should be able to think holistically about environment when taking architectural design decisions

**RECOMMENDED READINGS:**

1. Textbook for Environmental Studies for undergraduate courses of all branches of higher education, ErachBharucha for University Grants Commission
2. Objective Environmental Science, B.B.Singh
3. Fundamentals of Environmental Studies ,MahuaBasu and S.Xavier
4. Environment and Development,1st Edition, Basic Principles, Human Activities, and Environmental Implications, Editors: Stavros PouloupoulosVassilisInglezakis

<b>HISTORY OF ARCHITECTURE AND CULTURE IV</b>			
Course Code		2201931 [SS]	
TeachingScheme		ExaminationScheme	
TotalContact Hours per week= (lectures=1, Studio=2, Total=3)		Sessional [CIA 25+EA 25] Viva	50NIL
		In-semester exam	NIL
		End Semester exam	NIL
		TotalMarks	50
		Total Credits	02

**Course Objectives:**

1. To introduce students to the developments in architecture of the post-medieval Western World as a result of the cultural, political, and economic contexts.



2. To study the development of architecture with specific reference to form, technology, and ornament.
3. To understand contemporary architecture of the world with respect to historical precedents.

**Course Outline:**

- Unit 1: Industrial revolution and the resulting architecture of eighteenth, and nineteenth century in Europe.
- Unit 2: Revival architecture in Europe and America
- Unit 3: Colonial Architecture in India
- Unit 4: Early Modern movements
- Unit 5: Modernism, International style, and influence of Bauhaus
- Unit 6: Post-independence Architecture in India till 1990.
- Unit 7: Post liberalization Architecture in India.

**Sessional Work:**

- .Minimum 25 representative buildings of the periods under study should be represented in Plans, sections and views- of various buildings discussed in the above units.
- One measured drawing and digital documentation of any site/ building/ part or features of a building related to the course content studied.. This can be undertaken as group work with identifiable individual contribution.
- One tutorial.

**Course Specific Outcomes:**

1. An understanding of architecture as a product shaped by various factors like technological developments, colonization, globalization, economy, and urbanization.
2. An understanding of the formal, structural, and stylistic aspects of architectural development.
3. An understanding of contemporary architecture of the world with reference to historical precedents and responses to the same.
4. An understanding of the architecture of colonial and post-independence India.

**Recommended Readings:**

- Bhatt, Vikram and Peter Scriver. Contemporary Indian Architecture After the Masters. Mapin Publishing Pvt Ltd, 1990.
- Correa, Charles and Kenneth Frampton. The Work of Charles Correa. Thames and Hudson, 1996.
- Curtis, William J R. BalkrishnaDoshi- An Architecture for India. Rizzoli, 1988.
- Curtis, William J R. Modern Architecture Since 1900. Phaidon, 2007.
- Dingle, Narendra. Dialogues with Indian Master Architects. Marg Foundation, 2015.
- Dhongde, Sharvey and ChetanSahasrabudhe (eds). AchyutKanvinde. BNCA Publication Cell, 2009.
- Droste, M and Bauhaus Archiv. Bauhaus 1919-1933. Taschen, 1993.
- Eastlake, Charles Locke. A History of the Gothic Revival. Cambridge University Press, 2012.
- Fletcher, Sir Banister and Dan Cruickshank. Sir Banister Fletcher's A History of Architecture On The Comparative Method. Architectural Press, 1996.



- Hitchcock, Henry Russell and Philip Johnson. The International Style. W W Norton, 1997.
- Kagal, Carmen (ed). Vistara- The Architecture of India. The Festival of India, 1986.
- Lang, Jon. A Consise History of Modern Architecture in India. Permanent Black, 2002.
- The Masters of World Architecture (Series).
- Twombly, Robert (ed). Louis Kahn- Essential Texts. W W Norton, 2003.
- Various monographs on the works of twentieth century Architects.

<b>Building Services II</b>		
Course Code	2201932 [P] & 2201933 [SS]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=2, Total =4)	Sessional [CIA 25 + EA 25]	50
	In semester exam	30
	End Semester exam	70
	TotalMarks	150
	Total Credits	03

### **COURSE OBJECTIVES:**

To introduce students to Building Services in low, medium and high rise buildings and inculcate in them the understanding of integration of services in architectural design. The Building Services will include

- Solid Waste Management
- Lighting –Natural and Artificial
- Electrification

### **COURSE CONTENT:**

**Unit I –Solid Waste Management-** This unit covers the collection, treatment and disposal of organic and in-organic waste

- Collection- Garbage chutes and space requirement for manual mechanism
- Treatment and Disposal -Introduction to vermicomposting, organic waste composters, incinerators etc. and space requirements on site and in building

**Unit II -Lighting-Natural-** Introduction to integrated design approach for daylighting to cover

- Passive design strategies of siting, form, fenestration design,
- Choice of glazing material
- Methods for predicting daylight i.e. daylight factor.
- New technologies to access (light pipes) and control daylight (Lighting Controls)



### **Unit III -Lighting-Artificial**

- Introduction to different sources of light, their characteristics (CRI, Color temperature and lamp life, energy consumption) lighting systems (Direct & Indirect) and their applications in building projects
- Lumen Method for designing appropriate lighting as per NBC 2016

### **Unit IV - Electrification**

- Electrical installations in a building from the supply company mains to individual outlet points including meter board, distribution board, layout of points with load calculations.
- Electrical wiring systems for small and large installations including different materials involved
- Electrical control and safety devices – switches, fuse, circuit breakers, earthing, lightning conductors etc.
- Introduction to alternative sources of energy such as Solar PV, Wind turbines etc. and integration in building design

### **Unit V-Low Voltage network systems**-Introduction to Low Voltage electrical systems and its integration in BMS –

- Wi-Fi and LAN network EPABX & Telecommunication system
- CCTV (Closed circuit TV and camera system)
- FA PA (Fire Alarm and Public address system)
- Access systems (Access control, Tracking, planning and provisions made)

### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK:**

- Preparing electrical layout and lighting plan of a building interior supported with necessary calculations (70% weightage).
- Visits to construction sites and preparing site visit reports, market survey and finding out latest trends and new materials for all the units.(30% weightage).

### **OUTCOME:**

Students should be able to understand basic principles of daylight and artificial lighting and should be able to design a lighting plan for a space. They should be able to calculate the energy requirement of building electrical systems. Students should be able to identify space requirements and integration of these systems in architectural design.

### **RECOMMENDED READINGS:**

- National Building Code of India 2016-Volume 2 , Bureau of Indian Standards
- Building Services and Equipments by Ashok L. Chhatre
- Building Services, By Mrs. Shubhangi Bhide
- Building Construction Illustrated by Frances D K Ching



- Basics Lighting Design Ed. by Bielefeld, Bert
- Daylight in Architecture-Benjamin Evans
- Lighting in Buildings-HapkinsenH.D.Kajr
- Lighting in Architectural Design -Derek Philip

<b>SITE SURVEY AND ANALYSIS</b>			
Course Code		2201934 [SS]	
TeachingScheme		ExaminationScheme	
TotalContact Periodsperweek (lectures=1, Studio=3, total=4)		Sessional [CIA 25 + EA 25]	50
			nil
		In-semester exam	nil
		End Semester exam	nil
		TotalMarks	50
	Total Credits	2	

#### **COURSE OBJECTIVES:**

- To introduce students to the various factors related to Site Survey and Analysis relevant to Architectural Site Planning
- To enable the students to get conversant with locating the object positions in horizontal and vertical plane
- To prepare and interpret survey drawings.
- To develop understanding of contours and grading for Site development
- To analyze physical, socio-cultural and contextual parameters of the site enabling Site planning

#### **COURSE OUTLINE:**

- **Unit 1. Linear Measurements** Measurements in horizontal plane, survey stations, survey lines open and closed traverse, locating objects by chaining and offsetting, direct and indirect ranging, locating field boundaries and working out area of field, measuring distances with chain, tapes, ODM's ,EDM's, introduction to Total Station, survey accessories, measurements along sloping ground. Chain Surveying: Base line, tie lines, check lines, Understanding of land demarcation drawings.
- **Unit 2. Directional and Angular Measurements** Magnetic and true meridian, Magnetic and true bearings, use of bearings, use of prismatic compass, calculation of included angles, Fore and back Bearings, declination plotting and adjustment of closed traverse, Uses of Transit Theodolite. Measuring horizontal and vertical angles, calculation height of buildings, use of Theodolite as tachometer, tacheometric tables





- **Unit 3. Levelling** Dumpy level, auto and tilting level, principle lines of levelling instrument, axis of telescope, axis of bubble tube, line of collimation, vertical axis recording by collimation plane, method and rise-fall method, B.S./I.S./F.S, change point, level surface, horizontal surface, datum, Reduced Level/ elevation of a point, Bench Marks, GTS, PBM/ABM/TBM. Temporary Adjustments.
- **Unit 4. Plane Table Surveys** Accessories used in plane tabling, methods of locating objects, methods of table orientation, Advantages and disadvantages. Use of Planimeter: Area of zero circle, calculating area of irregular shape figures.
- **Unit 5. Contours** Plotting the contours and profiles, interpolation of contours, contour interval, Characteristics of contours, Profile levelling: Understanding gradient, cut and fill for desired ground level, direct and indirect methods of contouring, block contour surveys
- **Unit 6. Site Analysis and Synthesis** Understanding of Natural and Manmade aspects (such as microclimate, topography, hydrology and vegetation), physical and socio-cultural context of the site. Site Analysis of the above parameters, Site Synthesis and Site Suitability

#### SESSIONAL WORK:

- 1) Calculation of area of field (Chain and cross staff survey)
- 2) Compass Survey.
- 3) Plane Table Survey.
- 4) Block Contour Survey.
- 6) Slope Analysis and Profile Levelling.
- 7) Site Analysis and Synthesis (Associated with Design Project)

#### COURSE OUTCOME

- At the end of the course students would be able to comprehend the site characteristics, reading and interpreting survey drawings, understanding equipment and methods of surveying leveling.

#### REFERENCE BOOKS:

- 1) Basak, N.N, *Surveying and Levelling*, McGraw Hill Education (India) New Delhi, 1994
- 2) Kanetkar, T.P, Kulkarni, S.V, *Surveying and Levelling*, Pune Vidyarthi Griha Prakashan, 2014
- 3) Lynch, K, *Site Planning*, Cambridge: The MIT Press, 1962

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<b>Architectural Design IV</b>		
Course Code	3201935 [SV]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=1 Studio=6, Total = 7)	Sessional [CIA 100 + EA 100] Viva [Int 25 + Ext 25]	200 50
	In semester exam	NIL
	End Semester exam	NIL
	TotalMarks	250
	Total Credits	10

### **COURSE OBJECTIVE:**

**To understand Architectural Design as a process of generating design brief and taking design decisions based on the following aspects:**

- **Socio-Cultural Aspects:** To introduce students to socio-cultural aspects like lifestyle, culture, traditions, and their effect on architectural design etc.
- **Aesthetics:** To understand the Aesthetic aspects of Design (visual and experiential) along with spatial attributes (scale and proportions, volume, texture, light and shadows, etc.) and formal characteristics. (profile, base, corner, termination).
- **Anthropometry & Function:** To address functional aspects of design (activity, use of space, adequacy and efficiency of space for a particular activity, essential adjacencies of spaces, ease and efficiency of circulation, light, ventilation, user-space relationship, vertical connections)
- **Climate:** To understand the Climatic aspects those have a bearing on architectural design and address climatic concerns like adequate light, ventilation, protection from rain, insulation, shading, heat gain, through passive strategies.
- **Building Material and Construction Technology:** To study relevance of various building materials to a project, to get introduced to various expressions of a building material, to introduce a student to the construction technologies relevant to the building materials chosen, to understand the scope and limitations of a building technique to achieve the desired form and space.
- **Building Services:** To understand the spatial and structural implications of basic services involved in building design.
- **Site :** To understand the site and its context, both immediate and wider, in order to enable students to take decisions of zoning, circulation within site, distribution of built and open spaces, activity relationships and adjacencies, and views.
- **Universal Design:** To understand the concept and principles of universal design.
- **Precedent Studies:** To introduce the students to learn from case, referral, live studies - process of observation, analysis, documentation and deriving inferences.



## **COURSE OUTLINE:**

1. Designing of progressively complex spaces and buildings in terms of area, a specific community, typology, function etc, with emphasis on either scale or complexity of the project, or both.
2. Project could be evolved based on the current needs of the city and / or context responding to aspects like heritage and conservation, landscape and ecology, image and identity, etc.
3. Development of building design program from not only client or user's requirements but also in response to context specific factors like socio-economic, socio-cultural, environmental etc.
4. Introduction to develop a design philosophy/narrative as a thought process in design.
5. Analysing activities around the buildings within a campus and understand the same in context to relation of built form and open spaces, elements of landscape, pedestrian and vehicular movement, their segregation, managing sloping sites, contours, etc.
6. Introduction to Campus design with reference to design of campuses developed in the past.
7. In case of multiple buildings (existing and/or proposed) to be accommodated within a campus, analyse and understand their relationship with each other in context to establish continuity of form, construction, materials, design theme, climate, etc. and the same should reflect in the drawings and models.
8. Integrating functions, structure and services in a building with relevant structural system and its resultant effect on visual form / character of building
9. To understand various issues and aspects of sustainability, earthquake resistance, construction, universal accessibility, etc. and study how these could be integrated in the architectural design process.  
To study a location in urban context preferably in a different socio-geographic setting other than the Institute (not mandatory), and document the study done in the tour in the form of a report with emphasis on relevant aspects like climate, social structure, culture, architectural typology, construction technology, urban fabric, economy, etc or any other issues which need to be considered for envisaging a design project in totality.

## **SESSIONAL WORK**

**Assessment Criteria:** Major project should have 80% weightage and 20% weightage should be given to the minor project.

### **A] Major project:**

**Project based on Campus Design** with emphasis on site planning & relationship of built and open spaces, circulation and movement pattern, activity pattern, architectural character, image, identity, philosophy etc.

#### **Deliverables:**

- i. Portfolio A - Architectural drawings at an appropriate scale preferably 1:200/1:100. And model to appropriate scale.
- ii. Portfolio B - Process drawings / tracings (Recommended)
- iii. Study models of various stage (Recommended)

### **B] Minor project:-**

**A Time Bound Project** of 12 hours as a means to gauge students' ability to apply the learning of the design studio and in the process acclimatizing them to work under time constraint and meet deadlines. This project of 12 hrs may be based on the parameters of the Design VI paper such as :



1. The suggested nature of project can be in the form of a social amenity in an urban context. However individual colleges do have freedom to choose a topic.
2. Size of the site given for the design should be such that it fits imperial size sheet.
3. Preferred scale of the drawing would be 1:200.

Deliverables: Architectural drawings in appropriate scale preferably 1:200/1:100. (Model optional).

### **COURSE OUTCOME:**

1] Build competency and ability to make communicative architectural drawings that are of readable scales, preferably in:

1:200 (Site level drawings & Model)

1:100 (Cluster level drawings)

Appropriate details to be explored at 1:50/20/10 etc.

2] Be able to negotiate various scales in drawings and models.

3] Be equipped to resolve structural systems of various construction techniques and services.

4]

### **REFERENCE BOOKS**

1. Lynch, K., Lynch, K. R., & Hack, G. (1984). *Site planning*. MIT press.
2. Rybczynski W. (1984). *How the Other half builds, Volume 1 : Space*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
3. Carlos Barquin (1986). *How the Other half builds, Volume 2 : Plots*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
4. Vikram Bhatt. (1990). *How the Other half build, Volume 3 : Self selection Process*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
5. Rapoport, A. (1969). *House form and Cultua*. Prentice-Hall of India Private Ltd.: New Delhi, India.
6. Correa, C. (2010). *A place in the shade: the new landscape & other essays*. Penguin Books India.
7. Dave, B., Thakkar, J., Shah, M., & Hāṇḍā, O. (2013). *Prathaa: Kath-khuni Architecture of Himachal Pradesh*. SID Research Cell, School of Interior Design, CEPT University.
8. Kanvinde, A., & Miller, H. J. (1969). *Campus design in India: experience of a developing nation*. Jostens/American Yearbook Company.
9. Adler, D. (2007). *Metric handbook*. Routledge
10. Neufert, E., & Neufert, P. (2012). *Architects' data*. John Wiley & Sons.
11. Gropius, W. (1956). *Scope of total architecture*. London: G. Allen & Unwin.
12. Giedion, S. (1967). *Space, time and architecture: the growth of a new tradition*. Harvard University Press.
13. Gibbered, Fredrick: *Town Design*.
14. David Gosling, Gordon Cullen – *Visions of Urban Design*.
15. Bawa, G., & Robson, D. (2002). *Geoffrey Bawa: the complete works*. Thames & Hudson..
16. Scheer, B. C. (2017). *The evolution of urban form: Typology for planners and architects*. Routledge.
17. It is strongly recommended that students are exposed on the books on works of Master architects



<b>Building Construction and Materials V</b>		
Course Code	3201936[P]&3201937 [SV]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=3, Total = 5)	Sessional [CIA 25 + EA 25] Viva [Int 25 + Ext 25]	50 50
	In semester exam	30
	End Semester exam	70
	TotalMarks	200
	Total Credits	06

### **COURSE OBJECTIVES:**

- To understand the variations in frame structure with options of different types of slab like flat slab, ribbed and waffle slabs etc. along with pre-stressed RCC technology.
- To understand the construction of single basement along with its waterproofing, provision for access and ventilation details. To understand the construction of different types of retaining walls and the detailing of the same
- To introduce materials and technology of assembling interior elements like partitions, suspended ceiling, furniture units etc.

### **COURSE CONTENT:**

#### **UNIT I Materials for Interior Essentials**

Characteristics, Properties and types of following materials and their application for interior essentials.

- Wood, wood derivatives and other panel materials used for interior application.
- Finishing materials like laminates, veneers, plastics and metal sheets.
- Paints and varnishes
- Hardware required for application to interior and furniture elements

#### **UNIT II Foundations, Retaining Wall& single basement construction**

- Concept of shallow and deep foundations with respect to basement construction, high rise buildings and different soil conditions
- Study of Single basement construction along with waterproofing details, also study of cast-in-situ and precast Retaining wall and its terminology, proportions and construction details.

#### **UNIT III Reinforced Cement Concrete construction**

- Reinforced cement concrete floor construction systems like flat plate, flat slab, ribbed slab, waffle slab, band beam and slab, pre-stressed slabs along with earthquake resistant features, reference of a RCC drawing



#### **UNIT IV Partitions and Paneling**

- Study of demountable partition construction using proprietary and non-proprietary systems using non-timber materials
- Proprietary and non-proprietary systems of paneling in various materials

#### **UNIT V Suspended Ceiling**

- Study of Suspended ceiling construction using proprietary and non-proprietary systems using various materials

#### **UNIT VI Furniture Design and assembly**

- Study of furniture for residential, commercial, office buildings and assembly details using timber and other material along with finishing and upholstery.

**SUBMISSION REQUIREMENT FOR SESSIONAL WORK:** Hand drafted drawings on Units 4, 5 and 6 to cover all the aspects of course outline in sufficient detail;; Assignments on units 1, 2, and 3 including sketches, notes, market survey.

**OUTCOME:** Students will understand of the principle, methods, advantages and disadvantages of concrete floor construction systems and single basement construction. Students will get to know the proprietary construction techniques for partition ceilings with latest available materials.

#### **RECOMMENDED READINGS:**

- Dr. B.C Punmia (2012) *Building Construction* (10th edition) Laxmi Publications.
- Harold B.Olin, John L. Schmidt (1994) *Construction principles, Materials and Methods*, John Wiley & Sons, Inc.
- Narayanamurty, D.; Mohan, D (1972) *The use of Bamboo and reeds in building construction*, UNO Publications
- Roy Chudley, Roger Greeno (2016), *Construction Technology*, 11th Edition Routledge.
- S.C.Rangwala (2013) *Engineering materials* (Fortieth edition), Charotar Publishing pvt.ltd.
- S.K. Duggal (2016) *Building materials* (4th edition) – New age international publishers.
- Willam Morgan (1977) *The elements of structure: An introduction to the principles of building and structural engineering* Distributed by Sportshelf; 2nd edition
- W.B. Mckay (2015) *Building construction Vol. 1* (5th edition), Vol. 2 (4th edition) and Vol. 3 (5th edition).
- National Building Code of India 2016 (Volume 1) and relevant I.S.I. Specifications.

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<b>Theory of Structures V</b>		
Course Code	3201938 [P]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=0, Total = 2)	In semester exam	30
	End Semester exam	70
	TotalMarks	100
	Total Credits	02

### **COURSE OBJECTIVES:**

- *To Understand Doubly Reinforced Beams, T and L Beams and to adopt span to depth ratios for them*
- *To Understand Design of columns across multiple floors changing grade and percentage of steel and grade of concrete*
- *To understand how to increase M.R of girders and Load carrying capacity of Stanchions. To study alternative methods of spanning vis-à-vis Portal Frames*
- *To introduce lateral pressure and understand the proportioning and stability of a gravity retaining wall*

### **COURSE OUTLINE:**

#### **Unit 1:Design of Beams Continued:**

- **Doubly Reinforced Beams:**Concept, Need, Applications. **Numerical** on Design of Doubly Reinforced Beams including calculation of Load and Shear Design
- **T Beams and L Beams:** Theory of Dividing a Large Hall Slab into Smaller one way or Two Way Slab units by using T Beams and L Beams. Concept, Applications and Advantages and Disadvantages. **Numerical** on Design of T Beams and L Beams including calculation of Load and Shear Design.
- Theory only on Design of **Coffered Slab** and **Flat Slab Construction**. Concept of Large Beam less Spaces, Column Capitals, Header Beams. I.S.456 Provisions for Various R.C.C Elements

**Unit 2: Design of Columns Continued:** Reasons for eccentricity of Load on a Column and I.S.Provision for eccentricity. **Numerical** on Calculation of load from floor to floor (From Slab to Beam to Column, Also load calculations from a given floor plate to be divided equally over columns). **Numerical** on Design of columns changing concrete grade and / or steel percentage and / or size of column.

**Unit 3: Foundations:**Theory of Shallow and Deep Foundations. Theory of foundations in Soil of Low S.B.C. Study of Isolated Footing, Combined Footing, Strip Foundations, Raft Foundations, Piles and Pile Caps. **Numerical** on Design of Isolated Footing including Single Shear and Double Shear, **Numerical** on design of combined footing in Plan Only.

#### **Unit 4: Design of Girders and Stanchions Continued:**



- Theory of Girders with flange plates to increase M.R of Section. **Numerical** on Design and Analysis of Steel Girders with flange plates.
- Extending the above Theory to Study Castellated Beams and Plate Girders. Theory only of Gantry Girders, Functions and Loads acting on each element of a Gantry Girder
- Theory of Stanchions with Flange Plates to increase Load Carrying Capacity. **Numerical** on Design and Analysis of Stanchions with Flange Plates, Finding thickness and size of Connecting Plate to Pad Foundation and Design of Pad.
- Theory only of Portal Frames, Basic Concept - Rigid, Two Hinged and Three Hinged Portal Frames with B.M.D. Advantages and Disadvantages of R.C.C Portal Frame - Detailing of Hinged and Pinned Column to Footing Junction. Advantages and Disadvantages of Steel Portal Frame - Detailing of Hinged and Pinned Column to Footing Junction, Rigidity at Beam to Column Junctions.

**Unit 5: Retaining Walls:Retaining Walls** - Need, Angle of Repose, Rankine's Theory, Different types of Retaining walls and their Applications, Study of Proportioning and Stability of Gravity Retaining Walls, Weep Holes and Effect of Surcharge. **Numerical** on Stability of Gravity Retaining Walls.

**Unit 6: Advanced Structures: Pre-stressed Constructions:** Concept and Process of Pre-tensioning and Post-Tensioning. Advantages and Disadvantages over Conventional R.C.C Construction. Use of High Strength Concrete and Steel in Pre-Stressed Elements.Methods of Pre-stressing - Freyssinet System. Numerical on Extreme Fibre Stresses at Mid Span and End Span.

#### **Reference Books**

1. Design of R.C.C. Structures by H.J.Shah
2. Design of R.C.C. Structures by Punmia and A.K.Jain
3. Design of Reinforced Concrete Structures by N.Krishnaraju
4. R.C.C Theory and Design by Dr. V.L.Shah and Dr.S.R.Karve

**Course Outcome:***At the end of semester student develops*

- *The understanding of larger space spanning both in R.C.C and Steel*
- *The understanding of carrying of vertical loads by R.C.C. Columns and Stanchions*
- *The understanding Lateral pressure and structural principles for overcoming it.*





<b>LANDSCAPE ARCHITECTURE</b>		
Course Code	3201939 [SS]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=1 Studio=3, Total =4)	Sessional [CIA 50 + EA 50]	100
	In semester exam	
	End Semester exam	
	TotalMarks	100
	Total Credits	03

### COURSE OBJECTIVES:

- To introduce the students to Landscape Architecture and its scope.
- To understand the elements and principles of landscape design and role of landscape elements in design of outdoor environments on the site.
- To understand the Intent and content of designed landscapes.
- To develop understanding of site analysis and site planning and integrated design of open and built spaces.
- Creating awareness about using Landscape design as a tool to address environmental concerns in Architecture.

### COURSE OUTLINE:

- **Unit 1.** Introduction to Landscape Architecture and its scope ,elements( natural and manmade) and their application in achieving functional, aesthetic, environmental and cultural goals.
- **Unit 2.** Principles and approaches in Landscape Design. Illustrations can be from contemporary as well as historic landscapes for understanding various approaches of design.
- **Unit 3.** Study of Hard landscape (civil work) details with respect to materials and construction techniques..
- **Unit 4.** Study of Softscape (plant material), their characteristics and contribution in terms of creating and imparting character to outdoor spaces.
- **Unit 5** Introduction to basics of Site planning and process of site planning.

### SESSIONAL WORK:

- Minimum two assignments to expose the students to landscape elements, their application, principles of design and approaches of design.
- Short duration projects such as eskees to allow students to explore the palette of landscape elements in open space creation and design. – Minimum 2.



- One long duration site planning and landscape design project preferably the third year architectural design project. The outcome shall be landscape design drawings, concept generation, site studies, analysis along with constructional details and planting concepts.

## REFERENCE BOOKS

- Mcharg, I, *Design with Nature*. John Wiley and co. 1978.
- Jellicoe, G and Jellicoe, S, *The Landscape of Man*, London: Thames and Hudson, 1991.
- Simonds, J. O, *Landscape Architecture: The Shaping of Man's Natural Environment*, N Y: McGraw Hill Book Co. Inc. 1961.
- Lynch, K, *Site Planning*, Cambridge: The MIT Press, 1962.
- Shaheer, M, Wahi Dua, G and Pal A (editors), *Landscape Architecture In India, A Reader: LA, Journal of Landscape Architecture*, 2013.
- Lyll, S, *Designing The New Landscape*: UK: Thames and Hudson, 1998.
- Dee, C, *Form And Fabric In Landscape Architecture: A Visual Introduction*, UK: Spon Press, 2001.
- Eckbo, G, *Urban Landscape Design*, N Y: McGraw hill co. 1961.
- Laurie, M, *An Introduction to Landscape Architecture*, N Y: American Elsevier Pub. Co. Inc. 1975
- Rutledge, A J. *A Visual Approach to Park Design*. New York: John Wiley and Sons, 1985.
- Randhawa, M S, *Flowering Trees*, New Delhi: National Book Trust, 1998.
- Bose, T K and Choudhary, K, *Tropical Garden Plants in Colour*, Horticulture and Allied Publishers, 1991.
- Krishen, P. *Trees of Delhi: A Field Guide*, Penguin India, 2006.
- Mukherjee, P, *Trees of India (WWF Natures Guide)*, Oxford, 2008.
- Sahni, K C, *The Book of Indian Trees (Bombay Natural History Society)*, Oxford, 1998.
- Krishna, N and Amrithalingam, M, *Sacred Plants of India*, Penguin Books Limited, 2014.
- Motloch, J. L, *Introduction to Landscape Design*, US: John Wiley and Sons, 2001.
- Dines, N and Harris, C, *Timesavers Standards for Landscape Architecture*, McGraw Hill Education, 1998.
- Reid, G, L, *Landscape Graphics*, Watson-Guptill, 2002.
- Botkin, D. B and Keller, E. A, *Environmental Science: Earth As a Living Planet*, N Y: John Wiley And Co. 1995.
- Grosholz, E, *The Poetics of Landscape Architecture*, University of Pennsylvania Press, 2010.

<b>ELECTIVE I [CONTEMPORARY ARCHITECTURE]</b>			
Course Code		3201940 [SS]	
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=1, Studio=2, Total=3)		Sessional [CIA 50+EA 50]	100
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	02



**Course Objectives:**

- To analyze the contemporary trends/approaches in architectural production in terms of design, practices, its perception, appreciation and critical discourses.
- To critically reflect and comment on contemporary architecture across the world.

**Course Outline:**

- Unit 1 - Post-Modernism and other movements in Architecture since the second half of 20<sup>th</sup> century.
- Unit 2 - Post 2000 CE trends in architecture, various critical discourses and current architectural issues
- Unit 3 - Analysis and critical appraisal of Architecture across the world

**Sessional Work:**

- Book review / article / chapter of a book in 1000 words.
- Unit 3 should be a research essay of about 1500-2000 words on a topic selected by the student and accompanied by an oral presentation of 15 minutes duration and discussion.

Students should be encouraged to follow the formalities of writing a research essay. The submission has to be in hand written format.

Students should be assessed primarily for the identification of issues, ability to take position and development of an argument.

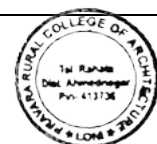
**Course Specific Outcomes:**

1. Application of the knowledge gained through the study of history of architecture to analyse contemporary architecture.
2. Development of individual view point and construction of an argument to put it across.
3. Skill of orally presenting a topic of choice, and generating a discussion.

**REFERENCE BOOKS**

- Buchanan, Peter. "The Big Rethink". The Architectural Review (AR), (Articles – December 2011, January to May 2012, July – September 2012, November 2012)
- Correa, Charles. A Place in the Shade: The New Landscape and Other Essays. Penguin Books India, 2010.
- Curtis, William J R. Modern Architecture since 1900. Phaidon, 2007.
- Frampton, Kenneth. Modern Architecture. Thames and Hudson, 1992.
- Hays, K. Michael. Architecture Theory since 1968 (2000). MIT Press., Oct 1997, Feb. 2000.
- Hertzberger, Herman. Lessons for Students in Architecture. 010 Publishers, 1973.
- Jencks, Charles. The New Paradigm in Architecture- The Language of Post-Modern Architecture. Yale University Press, 2002.
- Leach, Neil. Anaesthetics of Architecture, MIT Press, 1999
- Mehrotra, Rahul. Architecture in India: Since 1990. Pictor Publishing, 2007.
- Pallasma, Juhani. The Eyes of the Skin: Architecture and the Senses. Academy Press, 2 edition, 2005
- Smith, Koryden H. Introducing Architectural Theory. Routledge, 2012
- Unwin, Simon. Analysing Architecture. Routledge, 2002.
- Venturi, Robert. Complexity and Contradiction in Architecture. MOMA, 1966.
- Wigley, Mark. The Architecture of Deconstruction- Derrida's Haunt. MIT Press, 1993.

<b>Building Services III</b>	
Course Code	3201941 [P] & 3201942 [SS]



TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=1, Total =3)	Sessional [CIA 25 + EA 25]	50
	In semester exam	30
	End Semester exam	70
	TotalMarks	150
	Total Credits	03

### COURSE OBJECTIVES

- To comprehend building services as an integral part of architectural design process
- To obtain knowledge of technical and design aspects of natural ventilation, heating, cooling and HVAC

### COURSE OUTLINE

- Principles of working of natural ventilation, heating, cooling and HVAC systems, components, materials and provisions in architectural design
- Functional and aesthetical aspects of building services coordination in architectural design

### TEACHING PLAN

#### Unit I: Natural ventilation

- 1.1 Conditions of human thermal comfort
- 1.2 Factors affecting natural ventilation
- 1.3 Strategies to effect natural ventilation

#### Unit II: Mechanical ventilation

- 2.1 Systems of mechanical ventilation
- 2.2 Components of mechanical ventilation systems
- 2.3 Mechanical ventilation - Schematic design
- 2.4 Introduction to Psychometric charts

#### Unit III: Heating and cooling

- 3.1 Passive heating and cooling techniques
- 3.2 Low energy mechanical cooling techniques

#### Unit IV: Air-conditioning - 1

- 4.1 Principles of air-conditioning systems
- 4.2 Components of air-conditioning systems

#### Unit V: Air-conditioning - 2

- 5.1 Types of air-conditioning systems

#### Unit VI: Air-conditioning - 3

- 6.1 Onsite case study of air-conditioning system
- 6.2 Air-conditioning and ducting layout – Schematic calculations and design for a space / part of a building.

### SESSIONAL WORK

Tutorials for Units I, II, III, IV and V (50% marks)

Onsite case study report for 6.1 (25% marks)

Schematic air-conditioning calculations and ducting layout for 6.2 (25% marks)



## RECOMMENDED READING

- National Building Code of India 2016
- Air Conditioning Principles and Systems – Edward G Pita
- Environmental Science - B J Smith, G M Phillips, M Sweeney
- Building Service Handbook – Fred Hall and Roger Greeno
- Refrigeration and Air Conditioning – Arora Ramesh Chandra
- Fundamentals of Air Conditioning Systems – Billy C Langley
- Basic Refrigeration and Air Conditioning – P N Ananthanarayanan

<b>WORKING DRAWING I</b>			
Course Code		3201943 [SS]	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=3, total=4)		Sessional [CIA 50 + EA 50]	100
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	100
		Total Credits	2

## COURSE OBJECTIVES

- To enable the students to prepare working drawings of an architectural project and imbibe the significance of working drawings from the point of view of execution of the work on site and as important component of tender documents.

## COURSE CONTENT

- Introduction to the concept of working drawings and their importance.
- Graphical presentation of all the components of a building along with dimensioning and annotations.
- Understand and apply IS Codes and internationally accepted norms / conventions / methods of preparing a working drawing along with tabulation of schedules of materials, finishes and hardware.

## SESSIONAL WORK

- One working drawing of an architectural design project having load bearing structure with minimum 100 sq. m. carpet area. Manually drafted drawings [minimum 6] sufficiently explaining the building from the execution point of view.
- At least two details related to the design such as doors / windows / railings / kitchen otah etc. to suitable scale. (1 drawing)

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<b>Architectural DesignV</b>		
Course Code	3201944[SV]+3201945[P]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=5, Total = 7)	Sessional [CIA 100 + EA 100] Viva [Int 25 + Ext 25]	200 50
	In semester exam	NIL
	End Semester exam	100
	TotalMarks	350
	Total Credits	10

### COURSE OBJECTIVE:

To understand Architectural Design as a process of generating design brief and taking design decisions based on the following aspects:

- **Socio-Cultural Aspects:** To introduce students to socio-cultural aspects like lifestyle, culture, traditions, and their effect on architectural design etc.
- **Aesthetics:** To understand the Aesthetic aspects of Design (visual and experiential) along with spatial attributes (scale and proportions, volume, texture, light and shadows, etc.) and formal characteristics. (profile, base, corner, termination).
- **Anthropometry & Function:** To address functional aspects of design (activity, use of space, adequacy and efficiency of space for a particular activity, essential adjacencies of spaces, ease and efficiency of circulation, light, ventilation, user-space relationship, vertical connections)
- **Climate:** To understand the Climatic aspects those have a bearing on architectural design and address climatic concerns like adequate light, ventilation, protection from rain, insulation, shading, heat gain, through passive strategies.
- **Building Material and Construction Technology:** To study relevance of various building materials to a project, to get introduced to various expressions of a building material, to introduce a student to the construction technologies relevant to the building materials chosen, to understand the scope and limitations of a building technique to achieve the desired form and space.
- **Building Services:** To understand the spatial and structural implications of basic services involved in building design.
- **Site :** To understand the site and its context, both immediate and wider, in order to enable students to take decisions of zoning, circulation within site, distribution of built and open spaces, activity relationships and adjacencies, and views.
- **Universal Design:** To understand the concept and principles of universal design.
- **Precedent Studies:** To introduce the students to learn from case, referral, live studies - process of observation, analysis, documentation and deriving inferences.



## **COURSE OUTLINE:**

10. Designing of progressively complex spaces and buildings in terms of area, a specific community, typology, function etc, with emphasis on either scale or complexity of the project, or both.
11. Project could be evolved based on the current needs of the city and / or context responding to aspects like heritage and conservation, landscape and ecology, image and identity, etc.
12. Development of building design program from not only client or user's requirements but also in response to context specific factors like socio-economic, socio-cultural, environmental etc.
13. Introduction to develop a design philosophy/narrative as a thought process in design.
14. Analysing activities around the buildings within a campus and understand the same in context to relation of built form and open spaces, elements of landscape, pedestrian and vehicular movement, their segregation, managing sloping sites, contours, etc.
15. In case of multiple buildings (existing and/or proposed) to be accommodated within a site, analyse and understand their relationship with each other in context to establish continuity of form, construction, materials, design theme, climate, etc. and the same should reflect in the drawings and models.
16. Integrating functions, structure and services in a building with relevant structural system and its resultant effect on visual form / character of building
17. To understand various issues and aspects of sustainability, earthquake resistance, construction, universal accessibility, etc. and study how these could be integrated in the architectural design process.
18. To study a location in urban context preferably in a different socio-geographic setting other than the Institute (not mandatory), and document the study done in the tour in the form of a report with emphasis on relevant aspects like climate, social structure, culture, architectural typology, construction technology, urban fabric, economy, etc or any other issues which need to be considered for envisaging a design project in totality.

## **SESSIONAL WORK**

**Assessment Criteria:** Major project should have 80% weightage and 20% weightage should be given to the minor project.

### **A] Major project:**

**System oriented project** with emphasis on structural system, vertical and horizontal circulation, services like HVAC, electrical, fire-fighting systems, parking, rules & regulations etc. The project could also be evolved based on the need of the city with socio-economic context, historical context, ecological concerns, etc.

### **Deliverables:**

- i. Portfolio A - Architectural drawings at an appropriate scale preferably 1:200/1:100. And model to suitable scale.
- ii. Portfolio B - Process drawings / tracings (Recommended)
- iii. Study models of various stage (Recommended)

### **B] Minor project:**



**Option 1: A Time Bound Project** of 12 hours as a means to gauge students' ability to apply the learnings of the design studio and in the process acclimatizing them to work under time constraint and meet deadlines. This project of 12 hrs may be based on the parameters of the Design VI paper such as :

1. The suggested nature of project can be in the form of a social amenity in an urban context.
2. Size of the site given for the design should be such that it fits imperial size sheet.
3. Preferred scale of the drawing would be 1:200.

Deliverables: Architectural drawings in appropriate scale preferably 1:200/1:100. (Model optional).

**Or**

**Option 2: Study Tour linked short term project**

Deliverables: Study tour documentation must include architectural study supported by drawings, narratives, sketches, photographs and information presented in any other formats deemed suitable by the college and linked short term project.

### **COURSE OUTCOME:**

1] Build competency and ability to make communicative architectural drawings that are of readable scales, preferably in:

1:200 (Site level drawings & Model)

1:100 (Cluster level drawings)

Appropriate details to be explored at 1:50/20/10 etc.

2] Be able to negotiate various scales in drawings and models.

3] Be equipped to resolve structural systems of various construction techniques and services.

### **REFERENCE BOOKS**

18. Lynch, K., Lynch, K. R., & Hack, G. (1984). *Site planning*. MIT press.
19. Rybczynski W. (1984). *How the Other half builds, Volume 1 : Space*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
20. Carlos Barquin (1986). *How the Other half builds, Volume 2 : Plots*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
21. Vikram Bhatt. (1990). *How the Other half build, Volume 3 : Self selection Process*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
22. Rapoport, A. (1969). *House form and Cultua*. Prentice-Hall of India Private Ltd.: New Delhi, India.
23. Correa, C. (2010). *A place in the shade: the new landscape & other essays*. Penguin Books India.
24. Dave, B., Thakkar, J., Shah, M., & Hāṇḍā, O. (2013). *Prathaa: Kath-khuni Architecture of Himachal Pradesh*. SID Research Cell, School of Interior Design, CEPT University.
25. Kanvinde, A., & Miller, H. J. (1969). *Campus design in India: experience of a developing nation*. Jostens/American Yearbook Company.
26. Adler, D. (2007). *Metric handbook*. Routledge
27. Neufert, E., & Neufert, P. (2012). *Architects' data*. John Wiley & Sons.
28. Gropius, W. (1956). *Scope of total architecture*. London: G. Allen & Unwin.
29. Giedion, S. (1967). *Space, time and architecture: the growth of a new tradition*. Harvard University Press.
30. Gibbered, Fredrick: *Town Design*.





31. David Gosling, Gordon Cullen – Visions of Urban Design.
32. Bawa, G., & Robson, D. (2002). *Geoffrey Bawa: the complete works*. Thames & Hudson..
33. Scheer, B. C. (2017). *The evolution of urban form: Typology for planners and architects*. Routledge.
34. It is strongly recommended that students are exposed on the books on works of Master architects

<b>Building Construction and Materials VI</b>		
Course Code	3201946 [SV]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=3, Total = 5)	Sessional [CIA 50 + EA 50] Viva [Int 25 + Ext 25]	100 50
	In semester exam	NIL
	End Semester exam	NIL
	TotalMarks	150
	Total Credits	06

#### **COURSE OBJECTIVES:**

- To introduce the design potential of steel as a material in building construction and it's inherent structural benefits.
- To create awareness with the best practices of steel as a construction material.
- To understand the concept of modular co-ordination and industrialized building construction along with precast technology.
- To understand issues and construction of earthquake resistant frame structures.

#### **COURSE CONTENT:**

##### **UNIT I Metal and Metal alloys, Sheet roof covering**

- Types of steel used in building construction- Use of Structural and non-structural steel for low and medium span building , their properties and advantages of steel in construction.
- Market forms of structural and non-structural steel.
- Use of lightweight steel for building construction.
- Built-up sections for structural purpose.
- Sheet roof coverings --Characteristics, Properties, market forms of sheet roof covering for medium and long spans and their application.

##### **UNIT II Fencing and Gates**

- Fencing using different materials like steel, barbed wire, chain-link, weld-mesh and other available materials in market.
- Construction details of fencing and suitable gate with due consideration to design parameters.



### **UNIT III Steel Trusses**

- Understanding concepts of trusses, basic connections for trusses along with earthquake resistant features.
- Construction of trusses for low rise medium span buildings.

### **UNIT IV Steel structure construction**

- Understanding methods of construction of various components of steel structures; steel frame construction for multi-storey steel building.
- Construction details of assembly with stanchion, beams and metal deck flooring along with earthquake resistant features.
- Moisture and fire protections in steel framed buildings

### **UNIT V Modular co-ordination**

- Concept of modular coordination for Industrialized building construction, planning and construction details
- Precast floor and roof construction along with the following systems developed by CBRI:
  - Floor and roof construction using partially precast planks and joist.
  - Floor and roof construction using precast Waffle unit.
  - Introduction to locally available proprietary precast systems

### **UNIT VI Earthquake resistant frame structures.**

- Overview of earthquake resisting structural systems.
- Application of Moment resisting frames, crossed braced frames and shear wall for Earthquake resistance structures.

**SUBMISSION REQUIREMENT FOR SESSIONAL WORK:** Hand drawn drawings on Units 3,4 and 5 to cover all the aspects of course outline in sufficient detail;; Assignments on units 1, 2,6 include sketches, notes, market survey and case-studies.

**OUTCOME:** Students will develop an understanding of possibilities of steel as an important building construction material. Understanding of properties of ferrous and non ferrous metals as materials for buildings will able students to use Steel innovatively in building projects.

### **RECOMMENDED READINGS:**

- Central Public Work Department, Indian Building Congress. Handbook on Seismic Retrofit of Buildings. Narosa Publishing House. 2008
- Andrew Charleson. Seismic Design for Architects: Outwitting the Quake. Elsevier Ltd 2008
- Terri Meyer Boake. Understanding Steel Design: An Architectural Design Manual. Birkhauser Basel 2012.
- Stephen Emmitt. Barry's Advanced construction of buildings. Wiley, 2006



- Mackay J.K. Building Construction vol.-1-4. Longman Scientific & Technical, 1988.
- IS 7921 : Recommendations for modular coordination in building industry Horizontalcoordination
- IS 7922 : Recommendations for modular coordination in building industry Verticalcoordination
- M. M. Mistry. Modular coordination & prefabrication, Principles of Modular Coordination in building.
- BMTPC. Standards & Specifications for Cost-Effective Innovative Building Materials and Techniques. BMTPC 1996

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<b>Theory of Structures VI</b>		
Course Code	3201947 [P]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=0, Total = 2)	In semester exam	30
	End Semester exam	70
	TotalMarks	100
	Total Credits	02

**COURSE OBJECTIVES:**

- *To the study of effect of Lateral Pressure of Soil and Water for increasing heights.*
- *To Develop in Students the Feel for Structural Principles and their Relates to Building Design*
- *To Develop in Students the Concept that “Every Structure is a System that Forms the Space” and the fact that Architecture and Structure cannot be conceived independently.*
- *To Develop in Students the fact that Structural Engineering is a Specialist Discipline and that the Architect has to appreciate the consultant’s concern and make an informed choice about the most appropriate Structural System for his Building with Reasonable Understanding of its Economic and Operational Implications.*
- *To Develop in Students the Mathematical logic that would enable him to Design the Structural System for Ground +2 Storey R.C.C Structure and a medium span Factory Building in steel.*
- *To in-still in the Students a Confidence that they could develop and explore a Structural System of their own design and execute the same.*

**Unit 1: Lateral Pressure and Retaining Walls Continued:**



- Theory of **Cantilever Retaining walls**, their Proportioning, Stability, Reinforcement Detailing of Stem and Base, Shear Key. **Numerical** on Stability of Cantilever Retaining Wall, Design of Stem Reinforcement.
- Theory of **Counter Fort Retaining Wall**, Its Parts, Structural Action on Each Part and Reinforcement Detailing
- **Water Tanks in R.C.C:** Joints in Water Tanks, Limit State of Cracking, Minimum Percentage of Steel and Other Standards.
  - R. C.C. Circular Water Tank with Flexible and Rigid Joint between Wall and Base -Concept of Hoop Tension – Reinforcement Detailing.
  - R. C.C. Square and Rectangular Water Tanks -Reinforcement Detailing.
  - R.C.C. Under-Ground Water Tanks - Pressure Conditions -Reinforcement Detailing.
  - Over Head Water Tank - An Intze Tank - Parts and General Detailing

### Unit 2: Design of R.C.C Framed Structure:

- **Total review** of design of ground + two storied RCC building. Defining Structural system, different loads, Design sequence, transfer of load, Actual design procedure. Framing of a Given Plan as per constraints on Beam and Slab Depths
- **Understanding Structural Schedules and drawings**, Sketching Based on Given Schedule.

### Unit 3: Design of Steel Structures Continued:

- **Compound Stanchions:** Theory of Compound Stanchions. **Numerical** on Design and Analysis of Compound Stanchion. Lateral System Design of Lacing and Battening and other Lateral Systems in Theory Only
- **Trusses:** Truss types, **Numerical** on Design of Purlins and Transfer of Load to Trusses. **Numerical** on Design of Compression and Tension Members with Design of Bolted and Welded Joints. Connections in Structural Steel.

### Unit 4: Design of Steel Framed Factory Buildings:

- Total review of design of medium span factory building in steel. Structural systems, different loads, Design sequence, transfer of load, actual design, procedure, Understanding structural drawings.

### Unit 5: Understanding Wind Load:

- Factors Affecting Wind Load. Analysis of Win Load for Ground + 9 Storeyed Building.
- Resulting Stresses in Foundations due to Effect of Wind load on Tall Structures
- Effect of Wind Load on Roof.

### Unit 6: Advanced Structures:

- **Long span structural systems** in Steel and R.C.C like Domes. Vaults, Folded Plates, and Tensile Structures using Fabric. Advantages and disadvantages of different systems.



- **High Rise Buildings Structural System** like Rigid frame, Moment Resisting Frames, Braced Frames, Shear Walls, Out Rigger Systems, Tube Systems, Tube in Tube, Dia-Grid, Exo- Skeleton. Space Trusses etc. Appropriate System as per height.

**Course Outcome:** At the end of semester student develops

1. The understanding Effects of Lateral Pressure of Soil and Water
2. The sense to frame R.C.C and Steel Buildings
3. The Understanding of different Structural Systems for Larger Spans and Tall Buildings with an understanding of Wind Load

**Reference Books**

1. Design of R.C.C. Structures by H.J.Shah
2. Design of R.C.C. Structures by Punmia and A.K.Jain
3. Design of Reinforced Concrete Structures by N.Krishnaraju
4. R.C.C Theory and Design by Dr. V.L.Shah and Dr.S.R.Karve
5. L.S.Design of Steel Structures by S.K.Duggal
6. Design of Steel Structures By Limit State Method as per I.S.800- 2007 By S.S.Bhavikatti

<b>RESEARCH IN ARCHITECTURE I</b>		
Course Code	3201948 [SS]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week (lectures=1 Studio=2, Total =3)	Sessional [CIA 25 + EA 25]	50
	In semester exam	NIL
	End Semester exam	NIL
	Total Marks	50
	Total Credits	02

**COURSE OBJECTIVES:**

- To introduce students to Research in Architecture and its value in design
- To enable the students to prepare a research proposal.

**COURSE OUTLINE:**

- Unit I -- Introduction to the meaning and need of research in architecture. Introduction to various concepts such as types of variables, measurement of variables, sample selection, ethics in research.
- Unit II – Process of research – Methodology



- Unit III – Literature study
- Unit IV – Methods of research in architecture. Use of surveys, observations, experiments, secondary sources.

#### **SESSIONAL WORK:**

- Tutorial based on all of the above units
- Literature Review of at least 5 papers related to the topic of their choice.
- Research proposal giving details of aims, objectives, scope, limitations, methods, samples selected on the topic approved by the head of the institution.

#### **NOTE:**

- The guide must have minimum 5 years of teaching experience. Preferably a guide should not guide more than 8 students.
- It is desirable that the research proposal is presented in front of experts.
- It is beneficial to the students if the topic is related to the architectural design project of semester X.

#### **REFERENCE BOOKS**

Babbie, E. *The Practice of Social Research*. third edition. Belmont: Wadsworth Publishing Co., 1983. book.

Cresswell, J.W. *Research Design: Qualitative and Quantitative Approaches*. Thousand Oaks: Sage, 1994. Book.

De Vaus, D.A. *Surveys in Social Research*. Jaipur: Rawat Publications, 2003. Book.

Dey, I. *Qualitative Data Analysis: A User Friendly Guide for Social Scientists*. London: Routledge, 1993. Book.

Groat, L. & Wang, D. *Architectural Research Methods*. New York: John Wiley and Sons Inc., 2002. Book.

Kothari, C.R. *Research Methodology: Methods and Techniques*. New Delhi: WishwaPrakashan, 2005. Book.

Michelson, William. *Behavioural Methods in Environmental Design*. Stroudsburg, Pennsylvania: Dowden, Hutchinson and Ross, Inc., 1982.

Nachmias, C.F. & Nachmias, D. *Research Methods in Social Sciences*. Great Britain: St. Martin's Press Inc., 1996. Book.

Patton, M.Q. *Qualitative Evaluation Methods*. Newbury Park: Sage Publications, 1980. Book.

Sanoff, H. *Methods of Architectural Programming*. Vol. 29. Dowden Huthinson and Ross, Inc., 1977. document.



— . *Visual Research Methods in Design*. USA: Van Nostrand Reinhold, 1991.

<b>ELECTIVE II</b>			
Course Code		3201949 [SS]	
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=1, Studio=3, Total=4)		Sessional [CIA 50+EA 50]	100
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	100
		Total Credits	03

**Course Objectives:**

To allow the students to study a subject of their interest and develop theoretical as well as practical understanding of the same. As mentioned in the course structure of 2019 pattern syllabus [Appendix B] a student may adhere to a particular stream of elective of his/her choice and *nurture his/her area of interest and develop his/her expertise*. However colleges have to ensure that the student does not repeat a particular elective.

**Course Outline:**

Colleges have to develop course outline for the elective they wish to offer such that theoretical as well practical aspects are covered linking them to the field of architecture. Apart from lectures delivered by the subject resource persons, self study in form of hands on workshop / field work/ review of literature / seminar or any suitable format of learning may be adopted.

**Sessional Work:**

The submission to be devised by the colleges in form suitable to the elective offered. The format could be [but not limited to] as following.

- Field study reports
- Mapping / documentation / photographic / videographic documentation
- Measured drawings
- Computer based assignments
- Tutorials

**Course Specific Outcomes:**

<b>Building Services IV</b>	
Course Code	3201950[P] & 3201951 [SS]
Teaching Scheme	Examination Scheme



TotalContact Hoursperweek (lectures=2 Studio=1, Total =3)	Sessional [CIA 25 + EA 25]	50
	In semester exam	30
	End Semester exam	70
	TotalMarks	150
	Total Credits	03

### COURSE OBJECTIVES

- To comprehend building services as an integral part of architectural design process
- To obtain knowledge of fire safety provisions and aspects of good acoustics in architectural design

### COURSE OUTLINE

- Properties of sound, strategies for reducing noise, aspects of treatments for good acoustical conditions
- Provisions for fire prevention, life safety and fire protection as per NBC 2016-Part 4

### TEACHING PLAN

#### Unit I: Acoustics- 1

- 1.4 Generation and propagation of sound, properties of sound, human hearing ranges  
 1.5 Planning and design to control outdoor noise and indoor noise  
 1.6 Materials and construction for acoustical treatment, NRC and STC ratings

#### Unit II: Acoustics -2

- 2.1 Parameters for good acoustical conditions  
 2.2 Air and structure borne noise control

#### Unit III: Acoustics- 3

- 2.5 Reverberation time calculation and recommendation for acoustical treatment  
 2.6 Sound amplification systems

#### Unit IV: Fire prevention

- 4.1 The fire triangle, causes, impacts, basic terminology  
 4.2 Occupancy based classification of buildings, fire zones, construction types, fire rating requirements  
 4.3 Provisions for emergency power, escape lighting and exit signage, fire/smoke dampers  
 4.4 Provisions related to air conditioning, glazing, interior finishes, fire command centre

#### Unit V: Life safety

- 5.1 Exit requirements, egress components  
 5.2 Compartmentalisation, provision for basements, gas supply, fire detection and alarm

#### Unit VI: Fire protection

- 6.1 Fire extinguishers/fixed firefighting installations, static water storage tanks, pump house, automatic sprinkler installations, automatic high velocity and medium velocity water spray systems, fixed foam installation, gas-based suppression system, automatic water mist systems





### SESSIONAL WORK

- Tutorials for Units I to VI (50% marks)
- Reverberation time calculations and recommendations for acoustical treatment(25% marks)
- Design for provisions for fire prevention, life safety and fire protection (25% marks)

### RECOMMENDED READING

- National Building Code of India 2016
- Architectural Acoustics - M. David Egan
- Architectural Acoustics: Principles and Design - Madan Mehta, James Allison Johnson, Jorge Rocafort
- Auditorium Acoustics and Architectural Design - Michael Barron
- Building Services Handbook- Fred Hall, Roger Greeno.

<b>WORKING DRAWING II</b>			
Course Code		3201952 [SS]	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=3, total=4)		Sessional [CIA 50 + EA 50]	100
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	100
		Total Credits	2

### COURSE OBJECTIVES:

- To Introduce idea of Design Development and detailing and its relevance in converting 'concept design' to working drawing and hence the realization of design on site.
- To imbibe further the importance of working drawings as an essential tool for effective site execution and execution of a building contract.
- To expose to the standard methods, conventions, drawing annotations including International standards, IS codes, its application in working drawing set with material and component and schedules.

### COURSE OUTLINE:

- Lecture demonstration/s to elaborate on standard practices, conventions, graphic annotations, sequencing and cross reference systems of a good working drawing set.



- Design development and detailing of own **design** to resolve the design idea to one which can be executed/ constructed, exposing students to construction parameters, limitation and sequencing.
- Generating a working drawing set for the **chosen design/ building** with framed/composite construction including schedules of material, finishes, components and accessories
- Developing and drafting details of Civil work and furniture/ interior design including schedule of finishes

#### **SESSIONAL WORK:**

- Preparing a manually drafted/ CAD generated working drawing set of 'own design project' with carpet area not less than 250 Sq. M. and at least Ground plus one storied building having framed/composite construction. The set to also include at least two civil details out of following.
  - I. Façade / skin of the building with fenestration and weather protection.
  - II. Stairway/ staircase
  - III. Public Washroom
- Interior layout of any one space of about 25sq.m. Area showing furniture layout, fittings, lighting, partitions, reflected ceiling plan to a suitably large scale. And any one construction detail related interior finishes/ custom made furniture of following.
  - I. Suspended ceiling
  - II. Paneling or partitions
- A rough folio comprising of design development drawings, sketches supporting the final working drawing set shall be retained by the candidate.

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**SAVITRIBAI PHULE PUNE UNIVERSITY**  
**[Formerly the University of Pune]**



**DETAILED SYLLABUS OF FOURTH YEAR B. ARCH.**  
**2019 PATTERN**  
**To be implemented from AY 2022-23**

**BOARD OF STUDIES IN ARCHITECTURE**  
**FACULTY OF SCIENCE AND TECHNOLOGY**



## SEMESTER VII

<b>ARCHITECTURAL DESIGN VI</b>		
Course Code	4201953 [SV]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 8 (Lectures: 1, Studio: 7)	Sessional [CIA125+EA125]	250
	Viva [INT 25+ EXT 25]	50
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	300
	Total Credits	11

### **COURSE OBJECTIVES:**

To develop to Develop Architectural programming of the entire project for **housing** including the process of generating a design brief, developing design iterations based on issues involved and taking design decisions based on the following aspects

- **Precedent Studies:**  
To analyse cases, referral, live studies through the process of observation, survey and documentation and evaluate them for gaining a design approach.
- **Socio-Cultural Aspects:**  
To evaluate socio-cultural aspects like lifestyle, cultural beliefs and practices, traditions, etc. and their effect on housing design.
- **Economic aspects:**  
To understand the economic concerns with respect to the economic hierarchy of society and the corresponding architectural responses and solutions.
- **Site Context and Analysis:**  
To understand and apply the information of site, its location, topography, scale, context – both- immediate and wider, and land-use and understand the potentials, challenges, future requirements of the site to take decisions about design brief development in terms of numbers and types of tenements, ground coverage, building height, density as well as decisions about zoning, circulation within site, distribution of built and open spaces, activity relationships and adjacencies, and views.
- **House Typology:**  
To evaluate various housing typologies and their suitability to the project at hand. To explore various adaptations of a typology, clustering possibilities, and resultant built form so as to create a housing design using the relevant explorations.



- **Traffic and vehicular movement:**  
To understand and apply ideas about networking, hierarchy of connectivity, pedestrian and vehicular movement within the site and surrounding larger area.
- **Building Material and Construction Technology:**  
To study and analyse the relevance of various building materials and technologies to a project, various expressions of a building material and technology relevant to the building and to understand the scope and limitations of a building technique to achieve the desired form and space.
- **Building Services:**  
To understand and apply the spatial and structural implications of basic and advanced services involved in building design.
- **Aesthetics:**  
Along with the challenges of physical issues, students are also expected to create a spatial and visual language for their project.
- **Rules and Regulations:**  
To understand and apply legislative aspects with reference to the housing context and setting of the project site (Building byelaws, GDCR, CRZ, EPA, ECBC, GRIHA etc.)

#### **COURSE OUTLINE:**

1. To design complex housing spaces and buildings in terms of area, user group, typology, function etc, with emphasis on scale or complexity of the project.
2. To understand and analyse housing in urban context, preferably in a different socio-cultural-economic setting than the institute and document the study in the form of a report with emphasis on relevant aspects like density, climate, social structure, culture, architectural typology, construction technology, urban fabric, economy, services, traffic movement, etc. or any other issues which need to be considered for envisaging a design project in totality.
3. To develop a building design program from not only client's or user's requirements but also in response to context specific factors like socio-economic, socio-cultural, environmental etc.
4. To understand the development of a design philosophy/narrative as a thought process in design.
5. To evolve projects that may be based on the current needs of the city and / or context responding to aspects like heritage and conservation, landscape and ecology, image, and identity, etc.
6. To analyse activities around the buildings within the housing projects/ neighbourhoods in relation with built form and open spaces, elements of landscape, pedestrian and vehicular movement and segregation, etc.
7. To analyse and understand the relationship between various typologies of units, their combinations, clustering, and resultant buildings with respect to privacy,



socio-cultural needs, built-form configuration, structural/ service efficiency, density, topography, climate, etc.

8. To design buildings integrating functions, structural system and services and understand its resultant effect on visual form / architectural character of building.
9. To understand various issues and aspects of sustainability, earthquake resistant construction, universal accessibility, etc. and understand how these may be integrated in the architectural design process.
10. To apply relevant legislative provisions (Building byelaws, GDCR, CRZ, EPA, ECBC, GRIHA etc.) to the design project.

### **SESSIONAL WORK**

- **Unit 1:**  
Case studies and analysis of housing design typology as identified by the institute and the presentation of its findings.
- **Unit 2:**  
A well resolved and communicated architectural design for a multi-family, multi-typology residential development of 100 to 200 tenements evolving out of aspects like mixed-use development, development of communities, addressing issues of social stratification v/s inclusiveness, identification of target group/ end-user's requirements, relation of location/ land values on defining the housing product, typological innovations, context, green initiatives, etc.

### **DELIVERABLES**

The design must be communicated through architectural drawing and graphics, two and three-dimensional sketches, models/ visualisation, and narrative. Emphasis shall be given to the preparation of self-explanatory drawings, as in an Architectural Competition.

It is recommended that:

- 3- or 4-unit types/ sizes be explored in the project.
- The student be able to demonstrate his/her understanding about building technology and spatial provision for services
- The student should be able to demonstrate his/her design response to climate, and an understanding of suitable Landscape ideas.

### **RECOMMENDED READINGS:**

1. The Architecture of Rasem Badran: Narratives on People and Place. James Steele. Thames and Hudson. London, 2005.
2. The Housing Design Handbook: A Guide to Good Practice. David Levitt, Jo McCafferty. Routledge. London, 2019.
3. Atkins: Architecture and Urban Design. Atkins. Images Publishing Group. 2011.



4. Designing for Modern India. Vikram Bhat. Mapin Publishing Pvt Ltd. Ahmedabad, 2016.
5. Missing Middle Housing: Thinking Big and Building Small to Respond to Today's Housing Crisis. Daniel G. Parolek. Island Press. 2020.
6. Housing and Urbanisation. Charles Correa. UDRI. Mumbai, 2000.
7. Residential Districts. Jorg C Kirschenmann, 1980.
8. Wohnungsbau The Dwelling L' habitat. Herald Deilmann D, Jorg Kirschenmann, Herbert Pfeiffer. Stuttgart, 1974.
9. In the Name of Housing: A Study of 11 Projects in Mumbai. Sameep Padora (curator). UDRI. Mumbai, 2016.

<b>ADVANCED BUILDING CONSTRUCTION AND SERVICES I</b>		
Course Code	4201954 [SV]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 3 (Lecture: 1, Studio: 2)	Sessional (internal)	50
	Sessional (external)	50
	Viva (internal)	25
	Viva (external)	25
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	150
	Total Credits	04

### **COURSE OBJECTIVES:**

To educate students regarding implementation of advanced structural systems, materials and services required in buildings with complex and special requirements and enable the students to integrate the same in Architectural design.

### **COURSE OUTLINE:**

- **Unit 1: Multi-basements**

Designing and construction of multi-basements giving constructional details required for services lighting, mechanical ventilation and surface water disposal. Study of various methods of access to parking areas other than ramps like car lift etc.

Assignment will be to prepare drawings based on above study which include application of all required services with total coordination of entire MEP services. [Minimum four A1 drawing sheets]

- **Unit 2: Swimming pools**

Design and construction of swimming pools – leisure / competition types with situations such as, at ground / podium/upper / roof top level with reference to all constructional and services details. Assignment will be on the same. [Minimum two A1 drawings sheets]



- **Unit 3: Long span structures**

Study of long span steel structures [indoor stadia, railway / metro stations, shopping malls, sky walks, Multi-functional building etc] to understand structural behaviour.

Assignment would be in report form comprising of Case study and sketches of construction details.

**OR**

- **Unit 3: Industrial structures**

Design and construction of medium scale industrial structures with reference to all architectural, constructional details.

Assignment will be on the same. [Minimum two A1 drawings sheets]

**RECOMMENDED READINGS:**

1. Tricomi, Ernest. ABC of Air-conditioning.1970
2. Smith, Philips & Sweeney. Environmental Science
3. Daniels, Klaus. Advanced Building Systems – A Technical Guide for Architects and Engineers. Birkhauser, Boston. 2003
4. National Building Code of India ,5. PEB manufacturer’s details Advanced Building Construction by MACKAY Stadia by John Geraint

<b>URBAN STUDIES I</b>		
Course Code	4201955 [SS]	
Teaching Scheme	Examination Scheme	
<p style="text-align: center;">Total Contact Hours per week: 4 (Lectures: 2, Studio :2)</p>	Sessional (internal)	50
	Sessional (external)	50
	Viva (internal)	NIL
	Viva (external)	NIL
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	100
	Total Credits	03

**COURSE OBJECTIVES:**

- To enable students to understand the urban context of an Architectural Project beyond the site and understand the implications of various factors (such as traffic-transportation, socio economics, urban landscape, spatial and visual aspects etc.) influencing the development of an urban area.
- To introduce the students to urban studies and relevance of its learning in Architecture profession; various theories and concepts, facilitating the undertaking of planning and design of large-scale land development.

**COURSE OUTLINE:**

- **Unit 1**





The meaning of town planning, urban planning, urban design and context of architectural project beyond site; Principles and theories of Urban Planning and Urban Design and relevance in the context of globalization.

- **Unit 2**

Various aspects of urban land. understand the implications of various factors such as traffic-transportation, socio- economic, urban landscape etc. influencing the development, rationale of urban regulatory controls.

- **Unit 3**

Urban residential developments such as neighbourhood planning, high-rise housing, slum rehabilitation, public housing, town planning schemes etc.

- **Unit 4**

Affordable housing: introduction and concepts; Contemporary problems of settlements, towns, cities impact of unplanned growth.

**SUBMISSION REQUIREMENT FOR SESSIONAL WORK:**

Handwritten journal based upon the theory syllabus as above.

**ASSIGNMENTS:**

1. Subdivision of land for residential development (approx. area 4Ha) –Individual submission (40 marks).
2. Study of housing typologies as mentioned in course outline, study of the same from urban planning and design perspective. - Case study in a group of maximum 5 students (30 Marks).
3. Two Tutorials based upon course outline (15marks each total 30 marks).

**OUTCOME:**

Students will develop a basic understanding of urban planning, urban design, studying urban planning principles and application of the same. Students will know about housing types, concerns & issues related to it and strategies to resolve issues.

**RECOMMENDED READINGS:**

1. Gallion, Arthur. The Urban Pattern. New Delhi: CBS Publishers and Disrtibuters, 2003
2. Bacon, Edmund. Design of Cities London: Thames and Hudson, 1974
3. Paddison, Ronan. Handbook of Urban Studies. London: sage Publications, 2001
4. Correa, Charles. Housing and Urbanisation. London: Thames and Hudson, 2000.
5. Mohanty , Swati. Slum in India. New Delhi:APH Publishing Corp.,2005.
6. Jagdale, Rohit. Slum Rehabilitation Schems in Mumbai. University of Texas 2014
7. Coordinates (is an exclusive monthly magazine on positioning, navigation, associated technologies, and applications.



8. Down to Earth (magazine edited by Sunita Narain)
9. My Liveable City (magazine co-founded by ShyamKhandekar& Shashikala Venkatraman)

<b>RESEARCH IN ARCHITECTURE II</b>		
Course Code	4201956 [SS]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 3 (Lecture: 1, Studio :2)	Sessional (internal)	25
	Sessional (external)	25
	Viva (internal)	NIL
	Viva (external)	NIL
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	50
	Total Credits	02

#### **COURSE OBJECTIVES:**

- To enable students to carry out research focused on an issue related to the built environment
- To prepare students to write a technical research paper
- To train students to present their research paper in front of an audience

#### **COURSE CONTENT:**

- **Unit 1**  
Qualitative and Quantitative Data Collection and Analysis
- **Unit 2**  
Presentation of qualitative and quantitative data using various techniques (visual, graphical, numerical, etc.)
- **Unit 3**  
Technical Writing
- **Unit 4**  
Presentation of research paper in a seminar

#### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK:**

- Tutorials/ Assignments based on each of the four units
- A Research Paper of minimum 3000 words (maximum 10 pages) excluding bibliography based on original research proposal prepared in Semester VI

#### **NOTE:**

- The guide must have minimum five years of teaching experience. The guide shall not guide preferably more than eight students.
- It is desirable that the research paper is presented in a seminar, in front of experts.



- It is beneficial to the students if the topic is related to their architectural design project.

### RECOMMENDED READINGS:

1. Babbie, E. 1983. *The Practice of Social Research*. Third edition. Belmont: Wadsworth Publishing Co.
2. Creswell, J.W. 1994. *Research Design: Qualitative and Quantitative Approaches*. Thousand Oaks: Sage.
3. De Vaus, D.A. 2003. *Surveys in Social Research*. Jaipur: Rawat Publications.
4. Dey, I. 1993. *Qualitative Data Analysis: A User Friendly Guide for Social Scientists*. London: Routledge.
5. Groat, L. & Wang, D. 2002. *Architectural Research Methods*. New York: John Wiley and Sons Inc.
6. Kothari, C.R. 2005. *Research Methodology: Methods and Techniques*. New Delhi: Wishwa Prakashan.
7. Michelson, William. 1982. *Behavioural Methods in Environmental Design*. Stroudsburg, Pennsylvania: Dowden, Hutchinson and Ross, Inc.
8. Nachmias, C.F. & Nachmias, D. 1996. *Research Methods in Social Sciences*. Great Britain: St. Martin's Press Inc.
9. Patton, M.Q. 1980. *Qualitative Evaluation Methods*. Newbury Park: Sage Publications.
10. Sanoff, H. 1977. *Methods of Architectural Programming*. Vol. 29. Dowden Huthinson and Ross, Inc.
11. Sanoff, H. 1991. *Visual Research Methods in Design*. USA: Routledge Revivals.
12. \*\* Research papers published in journals from UGC-CARE list may be referred for understanding the overall structure and style of technical writing.

ELECTIVE III		
Course Code	5201970 [SS]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 4 (Lecture: 1, Studio :3)	Sessional (internal)	50
	Sessional (external)	50
	Viva (internal)	NIL
	Viva (external)	NIL
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	100
	Total Credits	03

### COURSE OBJECTIVES



To allow the students to study a subject of their interest and develop theoretical as well as practical understanding of the same

As mentioned in the course structure of 2019 pattern syllabus [Appendix B] a student may adhere to a particular stream of elective of his/her choice and nurture his/her area of interest and develop his/her expertise.

However, colleges have to ensure that the student does not repeat a particular elective.

### **COURSE OUTLINE:**

Colleges have to develop course outline for the elective they wish to offer such that theoretical as well as practical aspects are covered linking them to the field of architecture.

Apart from lectures delivered by the subject resource persons, self-study in form of hands-on workshop / field work/ review of literature / seminar or any suitable format of learning may be adopted.

### **SESSIONAL WORK:**

The submission to be devised by the colleges in form suitable to the elective offered. The format could be [but not limited to] as following.

- Field study reports
- Mapping / documentation / photographic / video graphic documentation
- Measured drawings
- Computer based assignments
- Tutorials

<b>QUANTITY SURVEYING &amp; SPECIFICATION WRITING I</b>		
Course Code	4201958 [THEORY]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 4 (Lectures: 2, Studio :2)	Sessional Viva	NIL
	In-semester exam	30
	End Semester exam	70
	Total Marks	100
	Total Credits	03

### **COURSE OBJECTIVES:**

- To Introduce Estimation as an important Subject for Architecture.
- To Understand Different methods of Computing Quantities for items of work in a structure.
- To acquaint students with methodology of writing specifications with reference to building trades, materials, workmanship & performance of different items of work.



## **COURSE OUTLINE:**

- To enable students in working out quantities of various items of work for simple load bearing and R.C.C. framed structure and acquaint them with various types of estimates including standard method of measurement on building works and mode of measurements as adopted by I.S 1200.
- Techniques, Importance & methods of writing different types of specifications of different items of works in construction
- **Unit 1: Introduction to Quantity Surveying**  
Introduction to Quantity Surveying and Estimating, Data for Estimate, Purpose of Estimating, Accompaniments of an Estimate, Qualities of an Estimator, Terminologies in estimation. Different types of Estimate their uses & Characteristics, Schedule of Quantities, Schedule of Rates & its uses, Stages of work, Complete Estimate of a Project, Methods of taking out Quantities, Measurement Sheet, Abstract Sheet, Bill of Quantities.
- **Unit 2: Introduction to Specification**  
Definition, need & importance of Specification writing. Relation with working drawing, bill of quantities, schedule of rates. Specification as an integral part of contract document. Types and Classification of Specifications. Use of manufacturers guide (With emphasize on Market survey )
- **Unit 3: IS Code**  
Study of mode of measurement as stipulated in IS-1200, Classification of strata as per IS-1200, Trial pit data, Lift and Leads , Unit of Measurement.
- **Unit 4: Working out quantities for Load-bearing structure**  
Working out quantities for load bearing structure (below plinth only) of approximately 15-30 Sqm by offset and centre-line method illustrating L and T junctions and preparing measurement sheet and abstract for all items of work.
- **Unit 5: Working out quantities for RCC structure**  
Working out quantities for R.C.C. G+1 structure of approximately 100-150 sqm, along with quantities for plumbing and sanitation items and preparing measurement sheet and abstract for all items of work.
- **Unit 6: Specification writing (Workmanship)**  
Item-wise detailed specifications including methods. Forms of writing descriptive notes on material and workmanship based on working drawing

## **RECOMMENDED READINGS:**

1. B.I.S 1200- Part-I 1992. n.d.
2. Prof. B.N. Dutta, Estimating and Costing in Civil Engineering.
3. B. S. Patil. Civil Engineering Contracts and Estimates.
4. Dr. Roshan Namavati. Professional Practice.
5. Rangawala. Estimating Costing and Valuation.
6. Indian Standard specifications
7. C.P.W.D. Specifications and schedule of rates



8. Specification Writing for Architects & Engineers, By Donald A. Watson
9. Specification Writing for Architects & Surveyors, By Arthur J. Wills
10. Estimating, Costing, Specification & Valuation, By M. Chakraborty
11. Reference drawings from offices of MEP consultants

<b>PROFESSIONAL PRACTICE</b>		
Course Code	4201959 [THEORY]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 3 (Lectures: 2, Studio :1)	Sessional Viva	NIL
	In-semester exam	30
	End Semester exam	70
	Total Marks	100
	Total Credits	03

### **COURSE OBJECTIVE:**

- To acquaint the student with the role & stature of the Architect in the society and understand duties, liabilities, responsibilities & ethics as a professional.
- To acquaint the student with the scope & avenues of Professional Architectural services and the demands & mode of Professional Practice field.
- To familiarize & prepare the student with the adequate knowledge of an Architect's office administration, documentation, banking, taxation & other procedures of office along with the Laws applicable to Architects.
- To familiarize the student with the Council of Architecture, Architect's Act, Architectural competitions & other allied professional organizations.

### **COURSE CONTENT:**

- **Unit 1**  
Introduction to the nature, scope and avenues of service and **professional practice as an Architect**, Role of an Architect as a **technical professional**. Illustrate the changing nature of the Architects.
- **Unit 2:**  
The Architects Act 1972, The Council of Architecture, its composition, legal status, and mandate for to Registration of Architects and for monitoring the Academics and Profession of Architecture, Rules and Regulations of the Council regarding Professional Liabilities & Code of Conduct. Introduction to Architectural Competitions, its Pros and Cons, Rules and Regulations as per Council of Architecture
- **Unit 3**  
Avenues of professional service and mode & nature of professional practice - Types of Organizations, Scope of comprehensive Services, Scale of Fees, and Site supervision, Documentation, Introduction to Office Management, & International practice.
- **Unit 4**



Taxation (Income tax, Goods & Service Tax and Professional tax), Banking, Insurance, and laws applicable to architects.

**Unit 5**

Introduction to the Role and Legal duties of Architects in Arbitration and Valuation.

**Unit 6**

Introduction to IIA, IIID, IUDI, ITPI, ISOLA and such professional organizations. Understanding the need for Architects to be aware, sensitive and active in Social and Civic issues in Urban context.

**RECOMMENDED READINGS:**

1. Latest published Handbook of Professional Document: Council of Architecture Publication
2. The Architect's Act, 1972: Govt. of India Publication
3. Professional Practice by Roshan H. Namawati
4. Professional Practice in India by Madhav G. Deobhakta
5. Architectural Practice & Procedure by Vasant S. Apte



## SEMESTER VIII

<b>ARCHITECTURAL DESIGN VII</b>		
Course Code	4201960 [SV]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 8 (Lectures: 1, Studio: 7)	Sessional [CIA125+EA125]	250
	Viva [INT 25+ EXT 25]	50
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	300
	Total Credits	11

### COURSE OBJECTIVE

To develop architectural interventions as part of a process to understand complex issues of an urban context, generating design brief and taking design decisions based on the following aspects:

- **Precedent Studies:**  
To introduce the students to Urban spaces from cases, referral, live studies through the process of observation, survey and, documentation and evaluate them for gaining a design approach.
- **Socio-Cultural Aspects:**  
To evaluate socio-cultural aspects like lifestyle, cultural beliefs and practices, traditions, and their effect on urban spaces and architectural design etc.
- **Site Context and Analysis:**  
To understand and apply information about the site, its scale, location, topography, context- both, immediate and wider, and complexity of existing functions, and understand the potentials, challenges, and future requirements of the site to take decisions of design-brief development in terms of types of buildings in urban complexes, multiple functions, multifunctional space typologies, area requirements, as well as decisions about zoning, circulation, distribution of built and open spaces, activity relationships and adjacencies, and views.
- **Traffic and vehicular movement:**  
To understand and apply ideas about networking, hierarchy of connectivity, pedestrian and vehicular movements within the masterplan and the surrounding context of site.
- **Building Material and Construction Technology:**





To analyze and evaluate the relevance of various building materials and technologies to a project, various expressions of a building material and technology relevant to the building and to understand the scope and limitations of a building technique to achieve the desired form and space.

- **Building Services:**

To understand and apply the spatial and structural implications of basic and advanced services involved in building design.

- **Aesthetics:**

Along with the challenges of physical issues, students are also expected to create a spatial and visual language for their project.

- **Rules and Regulations:**

To understand and apply relevant legislative aspects governing building design with reference to the urban context and setting of the site (Building byelaws, GDCR, CRZ, EPA, ECBC, GRIHA etc.)

### **COURSE OUTLINE:**

1. To design complex urban spaces and buildings (***other than housing***) in terms of area, function, specific community, typology, context etc, with emphasis on scale and / or complexity of the project.
2. To understand and analyse a location in an urban context, preferably in a different socio-cultural-economic setting than that of the institute and document the study in the form of a report with emphasis on relevant aspects like climate, social structure, culture, architectural typology, construction technology, urban fabric, economy, services, traffic movement, etc. or any other issues which need to be considered for envisaging a design project therein in totality.
3. To evolve projects that may be based on the current needs of the city and / or context responding to aspects like heritage and conservation, landscape and ecology, image and identity, etc.
4. To develop a building design program from not only client or user's requirements but also in response to context specific factors like socio-economic, socio-cultural, environmental etc.
5. To understand the development of a design philosophy/narrative as a thought process in design.
6. To analyse activities around the buildings within a complex/ campus and understand the same in context of the built form and open spaces, elements of landscape, pedestrian and vehicular movement, their segregation, managing sloping sites, contours, etc.
7. To analyse and understand the relationship between multiple (existing and/or proposed) buildings to establish continuity of form, construction, materials, design theme, climate, etc.
8. To design buildings integrating functions, structural system, and services and their resultant effect on visual form / architectural character of building.



9. To understand various issues and aspects of sustainability, earthquake resistant construction, universal accessibility, etc. and understand how these may be integrated in the architectural design process.
10. To apply relevant legislative provisions (Building byelaws, GDCR, CRZ, EPA, ECBC, GRIHA etc.) to the design project.

## **SESSIONAL WORK - ONE OF THE TWO OPTIONS**

### **PROJECT TYPE 1**

- **Unit 1:**  
Identification and analysis of issues related to various aspects mentioned above including mobility, networks, inclusiveness, built-form disposition, architectural character, identity, activities, community participation, etc. at an urban neighbourhood level of area (***other than housing***) @ 2-3 hectares with an aim to evolve a design brief and a design solution including a neighbourhood level master- plan and/or intervention guidelines in the context for the same.
  - The Architectural project should evolve from the study of the Area and be an outcome of issues identified, Development Plan proposals for the area if any and a subset of the overall Master Plan for the Area.
- **Unit 2:**  
A well resolved and communicated architectural design of a component/s of the neighbourhood studied as mentioned in Unit 1 above, with a total carpet area of not less than 6000 sqm and not more than 20000 sqm area of Functional Space depending on context and complexity of the project.

**OR**

### **PROJECT TYPE 2**

- **Unit 1:**  
Study of an urban area (***other than housing***) including aspects like mobility, movement networks, built form disposition, character, identity, activities, open space networks, walkability, inclusiveness, etc. as relevant to the area selected and the design brief proposed as in Unit 2 below.
- **Unit 2:**  
Development of Master Plan area of 2- 3 Ha in a group of three students maximum.
- **Unit 3:**  
Development of Design proposals individually for the area of any and a subset of the overall Master Plan.
  - A well resolved and communicated architectural design for a multi-functional building complex or a specialty building of a total carpet area not less than 6000 sqm and not more than 20000 sqm in an urban context with substantial complexity addressing Issues of architectural character, identity, built form, contextuality, structural system, advanced



services, green initiatives, landscape integration, traffic management, etc.

- Suggested typologies may include but not limited to: Healthcare facility, Educational Institution, 5 Star Hotel, Convention Centre, Multimodal Transport Hub, shopping mall and Multiplex, Redevelopment Project etc.
- An understanding of the project's impact on the surrounding area and vice-versa is suggested.

## DELIVERABLES

The design must be communicated through architectural drawings and graphics, two and three-dimensional sketches, models/ visualization, and narrative. Emphasis shall be given to the preparation of self-explanatory drawings, Master Plan for the Area, Designing of Multiple user spaces, Imageability and Identity, Structural Details and Services as in an Architectural Competition.

## RECOMMENDED READINGS:

1. All available books on Architectural Design.

<b>ADVANCED BUILDING CONSTRUCTION AND SERVICES I</b>		
Course Code	4201961 [SV]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 3 (Lecture: 1, Studio: 2)	Sessional (internal)	50
	Sessional (external)	50
	Viva (internal)	25
	Viva (external)	25
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	150
	Total Credits	04

## COURSE OBJECTIVES:

To help students to understand advanced structural systems, materials and services required in buildings with complex and very specific requirements. Students should be able to comprehend the special requirements of high rise or multi storied and modern buildings and be able to integrate the same in design.

## COURSE OUTLINE

- **Unit 1: Auditoriums / Multiplex**



Design and construction of Auditorium (minimum capacity 350 with provision of a balcony and projector room in case of multiplex) along with required services.

Assignment will be on preparing of drawings containing plans and sections, showing all services and constructional details [minimum four A1 drawing sheets]

- **Unit 2: Building elements & Elevation treatments**

Construction and architectural details of Building elements of design projects (previous semester/ previous year) For example—pergola, porches, atriums, façade, curtain wall, podium (with different use such as parking / landscape) etc.

Assignment will be based on preparing of drawings with complete details. [Minimum three A1 size drawing sheets].

- **Unit 3: High rise buildings.**

Introduction to construction of high-rise buildings with RCC as a material. Study of Council Norms with NBC Rules & analysis of structural system behaviour in high rise / super high-rise structures under different loading conditions.

Assignment will be in form of compiled notes and sketches.

**OR**

- **Unit 3: Industrial structures**

Design and construction of medium scale industrial structures with reference to all services details. Assignment will be on the same. [Minimum two A1 drawings sheets]

**RECOMMENDED READINGS:**

1. Tricomi, Ernest. ABC of Air-conditioning. 1970
2. Smith, Philips & Sweeney. Environmental Science
3. Daniels, Klaus. Advanced Building Systems – A Technical Guide for Architects and Engineers. Birkhauser, Boston. 2003
4. National Building Code of India
4. Advance building construction by MACKEY High Rise Buildings by Jaswant Mehta Theatres and Auditoriums by Harold Burris- Meyer & Edward Cole. Architects Working Details



<b>URBAN STUDIES II</b>		
Course Code	4201962 [SS]	
Teaching Scheme	Examination Scheme	
<p style="text-align: center;">Total Contact Hours per week: 4 (Lectures: 2, Studio :2)</p>	Sessional (internal)	50
	Sessional (external)	50
	Viva (internal)	NIL
	Viva (external)	NIL
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	100
	Total Credits	03

### **COURSE OBJECTIVES:**

- To introduce the students to the process of planning and urban development and associated legislation.
- To understand the fundamental concepts and theories of urban design and apply them in their design projects.
- To introduce the students to urban economics.

### **COURSE OUTLINE:**

- **Unit 1**  
Study of planning process in detail --- (Survey, analysis, proposals and development) for various urban issues. A brief introduction to urban renewal and re-development; study and analysis of urban spaces, people centric designs etc.
- **Unit 2**  
Conservation and related Urban Design controls.
- **Unit 3**  
Planning and Urban Design legislation --- introduction and relevance.  
Unified Building bye laws and Development Control rules of local authorities.
- **Unit 4**  
Urban economics: introduction and concepts (demand and supply, housing finance, Government schemes and various bodies) etc.

### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK:**

Handwritten journal based upon the theory syllabus as above.

### **ASSIGNMENTS**

1. Reading of Urban fabric: Study of existing town and town planning proposals for municipal council level town– (group work in a group of 5 students) (40 marks).
2. Identification of urban issues related to various aspects such as environment, society, traffic and transportation, hills and hill slopes, riverfront development,



urban heritage conservation through primary surveys (group work in a group of 5 students) (30 marks) –

3. Two Tutorial based upon course outline (15marks each total 30 marks).

### **OUTCOME**

Students will develop a basic understanding Planning and Urban Design legislation; studying planning process, survey, and application of the same to know about issues like urban economics, transportation.

### **RECOMMENDED READINGS:**

1. Gallion, Arthur. The Urban Pattern. New Delhi: CBS Publishers and Distributors, 2003
2. Bacon, Edmund. Design of Cities London: Thames and Hudson, 1974
3. Paddison, Ronan. Handbook of Urban Studies. London: Sage Publications, 2001
4. Sprerigen, Paul. Urban Design: The Architecture of Town and Cities.
5. Malabar, FL-USA Krieger Publishing Co., 1967 Lynch, Kevin. The Image of The City London: The MIT Press, 1960
6. Book of Development Control Regulations by Local Municipal Corporation (latest edition available)
7. Book of AITP Exam study material: 'Planning Law and Legislation' by ITPI New Delhi Guide to Planning Surveys including Landuse Classification: TCPO, Govt of India: 2004
8. Correa, Charles. Housing and Urbanisation. London: Thames and Hudson, 2000.
9. Howard, Ebenezer. Garden Cities of Tomorrow, 1902
10. Maharashtra Regional and Town Planning Act, 1966
11. Traffic and Transportation Planning by L.R. Kadiali
12. Coordinates (is an exclusive monthly magazine on positioning, navigation, associated technologies and applications.
13. Down to Earth (magazine edited by Sunita Narain)
14. My Liveable City (magazine co-founded by Shyam Khandekar & Shashikala Venkatraman)



<b>ELECTIVE IV</b>		
Course Code	4201963 [SS]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 3 (Lecture: 1, Studio :2)	Sessional (internal)	25
	Sessional (external)	25
	Viva (internal)	NIL
	Viva (external)	NIL
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	50
	Total Credits	02

### **COURSE OBJECTIVES**

To allow the students to study a subject of their interest and develop theoretical as well as practical understanding of the same

As mentioned in the course structure of 2019 pattern syllabus [Appendix B] a student may adhere to a particular stream of elective of his/her choice and nurture his/her area of interest and develop his/her expertise.

However, colleges have to ensure that the student does not repeat a particular elective.

### **COURSE OUTLINE:**

Colleges have to develop course outline for the elective they wish to offer such that theoretical as well as practical aspects are covered linking them to the field of architecture.

Apart from lectures delivered by the subject resource persons, self-study in form of hands-on workshop / field work/ review of literature / seminar or any suitable format of learning may be adopted.

### **SESSIONAL WORK:**

The submission to be devised by the colleges in form suitable to the elective offered. The format could be [but not limited to] as following.

- Field study reports
- Mapping / documentation / photographic / video graphic documentation
- Measured drawings
- Computer based assignments
- Tutorials



<b>ELECTIVE V</b>		
Course Code	4201964 [SS]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 3 (Lecture: 1, Studio :2)	Sessional (internal)	25
	Sessional (external)	25
	Viva (internal)	NIL
	Viva (external)	NIL
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	50
	Total Credits	02

### **COURSE OBJECTIVES**

To allow the students to study a subject of their interest and develop theoretical as well as practical understanding of the same

As mentioned in the course structure of 2019 pattern syllabus [Appendix B] a student may adhere to a particular stream of elective of his/her choice and nurture his/her area of interest and develop his/her expertise.

However, colleges have to ensure that the student does not repeat a particular elective.

### **COURSE OUTLINE:**

Colleges have to develop course outline for the elective they wish to offer such that theoretical as well as practical aspects are covered linking them to the field of architecture.

Apart from lectures delivered by the subject resource persons, self-study in form of hands-on workshop / field work/ review of literature / seminar or any suitable format of learning may be adopted.

### **SESSIONAL WORK:**

The submission to be devised by the colleges in form suitable to the elective offered. The format could be [but not limited to] as following.

- Field study reports
- Mapping / documentation / photographic / video graphic documentation
- Measured drawings
- Computer based assignments
- Tutorials





<b>QUANTITY SURVEYING &amp; SPECIFICATION WRITING II</b>		
Course Code	4201965 [THEORY]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 4 (Lectures: 2, Studio :2)	Sessional Viva	NIL
	In-semester exam	30
	End Semester exam	70
	Total Marks	100
	Total Credits	03

### **COURSE OBJECTIVES:**

- To enable students in preparation of rate analysis & indent preparation along with the concepts.
- To enable students in working out quantities of various items of work for an Industrial structure
- To acquaint students with methodology of writing specifications with reference to service installations of different items of work in construction.
- To enable students in different building trades & content, checklist.

### **COURSE OUTLINE:**

- **Unit 1: Rate Analysis**  
Introduction to Analysis of Rate, Factors affecting Rate of any Item of work, Importance of Rate Analysis, Essentials of Rate Analysis. Studying and Working out rate Analysis of standard items of work based on prevailing market rates. (Minimum 20 numbers)
- **Unit 2: Building trades & checklist**  
Different Building trades scope & contents. Checklist preparations for different works in constructions.
- **Unit 3: Indent of materials:**  
Unit Rate, Direct Cost, Indirect Cost, Overhead Charges, Day Work, Task Work, Piece work, Indent of Material, preparation of Indent of Material of standard items of work based on prevailing market rates. (Minimum 20 numbers)
- **Unit 4: Working out quantities for Steel Structures**  
Working out quantities for Industrial structure of approximately 200-300 sqm with steel Truss and sheet roofing and preparing measurement sheet and abstract for all items of work. (Including footing)
- **Unit 5: Specification for Building Services:**
  - Water Supply & Drainage,
  - Acoustics,
  - Electrification,
  - HVAC installation
- **Unit 6: Broad outline specification for miscellaneous service installations**
  - Communication systems- elevators, escalators



- Fire fighting
- Accessibility- arrangements for disabled persons

### RECOMMENDED READINGS:

1. B.I.S 1200- Part-I 1992. n.d.
2. Prof. B.N. Dutta, Estimating and Costing in Civil Engineering.
3. B.S.Patil. Civil Engineering Contracts and Estimates.
4. Dr. Roshan Namavati. Professional Practice.
5. Rangawala. Estimating Costing and Valuation.
6. Indian Standard specifications
7. C.P.W.D. Specifications and schedule of rates
8. Specification Writing for Architects & Engineers, By Donald A. Watson
9. Specification Writing for Architects & Surveyors, By Arthur J. Wills
10. Estimating, Costing, Specification & Valuation, By M. Chakraborty
11. Reference drawings from offices of MEP consultants

<b>PROJECT MANAGEMENT</b>		
Course Code	4201966 [THEORY]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 3 (Lectures: 2, Studio :1)	Sessional Viva	NIL
	In-semester exam	30
	End Semester exam	70
	Total Marks	100
	Total Credits	03

### COURSE OBJECTIVE

- Students need to understand reality of modern-day Project environment which is getting more complex and more collaborative due to ever demanding requirements of creative and unique design concepts and importance of Project Management to manage this dynamic environment
- Introducing to the students “Management Concepts “and the Role of an Architect as Project Manager in executing a project from conceptualization, design stage through the documentation and construction stage.
- This course will be an introduction to basics of Project Management framework and Knowledge areas giving glimpses on best practices to manage collaborative project environment and roles and responsibilities of various stakeholders of Project and how Project manager leads to successful project completion within cost and time and meets or exceeds project quality standards.

### COURSE OUTLINE

- **Unit 1: Introduction Project and Project environment**



Project and Project Environment. Traditional organization structure vs modern project management structure, Importance of Project Manager & role of an Architect as a Project Manager who integrates everyone. Collaborative project environment with multiple stakeholders and need to manage. PMBOK Environment, Concept of Project- Program- Portfolio and Processes / Policies / Procedures to manage these project environments.

- **Unit 2: Project Phases and Stages**

Importance of Project Phase: Concept and Feasibility, Planning and Design, Construction and Close-out and within each phase of project role of key processes – Initiating, Planning, Execution, Control & Monitoring and Close-out. Difference between Project Management and Construction Management.

- **Unit 3: Tenders and Contracts**

Definition and Types of tenders, Systems of Tendering - Open and Invited, Process of tendering. Tenders - Pre-Qualification and Empanelment procedures - Selection of Contractors. Tender documents, Terms of Reference - Specifications - Bill of Quantities - Billing, Introduction to Contracts - Articles of Agreement and Conditions of Contract ( IIA document )

- **Unit 4: Project Management Knowledge Areas Part 1**

Key concept introduction to various knowledge areas as defined in PMBOK to understand how various knowledge areas work in relationship with each other. Knowledge areas Integration management, Scope management, Schedule management, Cost management, Quality management

- **Unit 5: Project Management Knowledge Areas**

Resource management, Communication management, Risk management, Procurement management and Stakeholder management. Awareness and Introduction to Computer applications for effective Project Management.

- **Unit VI : Specialized Project Management Themes**

Importance of specialized themes in addition to knowledge areas: Project Finance management, Construction Safety management, Facilities management, Design management. Awareness and Introduction to Computer applications for effective Project Management. ( not to be included for SPPU examinations)

## **COURSE SPECIFIC OUTCOMES**

After completing this course student will be exposed to basic key concepts of Project Management and its importance in managing Project. The student should be competent enough to handle and manage a small-scale project from conceptualization to completion (hand over).

Subject knowledge gain may help few of the students to pursue master's education in the field of Project Management.

## **RECOMMENDED READINGS:**

1. PMBOK by PMI



2. Design management for Architects - by Stephen Emmitt
3. Project Management Concepts, Methods, and Techniques - by Claude H. Maley · 2012
4. Construction Project Management Planning, Scheduling and Controlling – by Chitakara.
5. Reference drawings and reports from offices of projects to understand the concepts.



**SAVITRIBAI PHULE PUNE UNIVERSITY**  
**[Formerly the University of Pune]**



**DETAILED SYLLABUS OF FINAL YEAR B. ARCH.**  
**2019 PATTERN**  
**To Be implemented from AY 2023-24**

**BOARD OF STUDIES IN ARCHITECTURE**  
FACULTY OF SCIENCE AND TECHNOLOGY



## SEMESTER IX

<b>PRACTICAL TRAINING</b>		
Course Code	5201967 [SV]	
Teaching Scheme	Examination Scheme	
Six months or One semester of approximate 16 working weeks [minimum 90 working days]	Sessional [CIA100+EA100]	200
	Viva [INT 25+ EXT 25]	50
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	250
	Total Credits	14

### **COURSE OBJECTIVES:**

- To undertake practical training under the guidance of experts / professionals.
- To Learn about architect's office management and learn about the process of design, execution, and management of a project.

### **COURSE CONTENT:**

- Students should work in office of an architect or organization operating in an allied field of practice or research duly approved by the institution, under the mentorship of a registered architect having experience of minimum five years.
- The Practical training should be supervised and evaluated through periodic assessment by the mentoring architect.
- The students should periodically report to the coordinating teachers from the institute and keep the institute informed about his/her training.
- End semester viva voce would be conducted by the examiners appointed by the University.
- Training in foreign country shall be done under the registered architect of that country and to be approved and monitored by the Head of Institute.

### **SUBMISSION REQUIREMENT:**

- Prepare a separate report along with formal log book & work diary.
- Student should maintain week wise work record in a diary to summarize the work done in the office, site visits, meetings with clients, agencies, interaction with principal architect. This diary should be authenticated by the architect every month.
- Professionals should issue a certificate of performance to the student with respect to the work quality, overall approach, attitude towards work.



- Students should produce report, log book, work diary & some sample drawings with permission from the employer [to indicate the kind of work s/he has carried out] at the time of sessional -viva voce examination.

**OUTCOME :**

Ability to understand real life situation of Professional Practice and to work with ethical and professional responsibilities.



## SEMESTER X

<b>ARCHITECTURAL DESIGN PROJECT</b>		
Course Code	5201968 [SV]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 13 (Lectures: 3, Studio: 10)	Sessional [CIA225+EA225]	450
	Viva [INT 50+ EXT 50]	100
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	550
	Total Credits	18

### OBJECTIVE

To provide an opportunity to the students to apply the knowledge and skills gained in earlier years to a full-fledged Architectural Design project of student's choice with a holistic approach including background research, programme formulation, site selection investigations and design demonstration.

### COURSE OUTLINE

The Architectural Design Project shall consist of Design Demonstration i.e. formulation of design programme, site investigation and selection, and culmination in architectural design proposal.

### TOPIC FOR ARCHITECTURAL PROJECT

The topic for the project shall be approved by the Institute and guided by the Faculty. The student may consult external resource persons specializing in the chosen topic, but the assessment shall be done by the faculty. A guide may guide up to EIGHT students during the session. In order to qualify to work as a Guide, the faculty must possess a minimum of TEN YEARS of teaching / professional experience.

### SUGGESTED CATEGORISATIONS OF THE TOPICS ARE AS UNDER:

1. Institutional Buildings
2. Infrastructural Buildings
3. Work places
4. Commerce and Trade buildings
5. Habitats
6. Healthcare





7. Hospitality
8. Religious Buildings,
9. Recreational Buildings
10. Industrial Buildings
11. Cultural Buildings
12. Urban Design project / Urban Design Insertions of suitable scale.
13. Conservation including Rejuvenation, Revitalisation of suitable scale.

Number of subcategories is possible under the above main categories as per the discretion of the Faculty Member.

The students may link the topic of the thesis to earlier explorations through Research in Architecture done in previous years or explore new concern as per his/her choice.

The scale of the project must do justice to the depth of involvement, (e.g., in case of very small projects in-depth design demonstration is expected)

However very large projects in specialized branches of architecture may not be encouraged and if taken up scope & scale needs to be limited as mentioned below.

The built up area & the scope of a project ( in particular in urban design, conservation, revitalisation etc ) should be chosen such that the same can be handled at the B. Arch. level and involves a demonstration of a solution involving Architectural Design in particular.

### **SESSIONAL WORK**

The portfolio of the final work submitted by the student shall contain MANUALLY LABOURED / COMPUTER GENERATED drawings of sheet sizes as per international standards and a PHYSICAL MODEL explaining the architectural proposal. The portfolio of process drawings and models must also be submitted separately for establishing continuous monitoring and progressive assessments, not to be marked separately. Along with the drawings A4 / A3 size bound report consisting of the background and rationale of the project, the methodology and the prints of the final proposal shall be submitted after the oral examination, to be kept in the library of the college. The choice of the size and format of the report is left to the institute, however, within one institute report size should be constant. In addition, the student may show other presentations like 3D views, walkthroughs etc.

### **SESSIONAL ASSESSMENT:**

The Internal assessment of the architectural project shall be carried out STAGE WISE as decided by the college. The final assessment in the examination shall be done by both Internal and External examiner in which the student shall display the work on the space allotted to him/her and explain his work and answer all the queries raised by the examiner.

The external examiner shall be a professional, not teaching at any institute as visiting or core faculty and shall have minimum 10 years of professional experience.



The examiners shall assess the work done and presented by the student, duly approved by the Faculty. The drawings and models duly stamped and signed by the Faculty shall be treated as authentic work done by the student under the guidance of the Faculty. The student may submit a sufficient number of drawings required to satisfactorily explain the project. The student shall also present a separate portfolio of study & process sheets, study models etc.

### ORAL EXAMINATION

The oral examination shall be held in the physical presence of the student in the examination centre of the candidate jointly and exclusively by the internal and external examiners. The student shall be allowed to present his project for a minimum 10 minutes without any interruption. The student shall be judged for the depth of understanding of the subject and clarity of graphical presentation of the project.

### RECOMMENDED READING:

All books, Research Articles relevant to the topic of the architectural project. Appropriate case studies of architectural projects of similar nature to the chosen topics must form part of the report on the thesis.

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<b>ENTREPRENEURSHIP DEVELOPMENT</b>		
Course Code	5201969 [SS]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 4 (Lectures: 2, Studio: 2)	Sessional	100
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	100
	Total Credits	03

### COURSE OBJECTIVE:

- To develop a spirit of entrepreneurship amongst budding architects, and empower and encourage students to be **“Archipreneurs”**
- To impart knowledge of the basics of entrepreneurship, management and legal aspects related to creation of new ventures
- To equip students with basic skills and competencies needed for ~~enterprise-oriented~~ professional development in architecture.
- To explore new vistas of entrepreneurship in the 21st century environment to generate innovative business ideas.

### COURSE OUTLINE:

- **Unit 1**  
Developing the mind-set of being an entrepreneur



- **Unit 2**  
Basic knowledge of Entrepreneurship, business management, finance and Law
- **Unit 3**  
Basic Entrepreneurial skills - Lateral thinking, problem solving, Oratory, Human Resource Management, Time management, Finance management, Office Administration and essential Software skills, etc.
- **Unit 4**  
New vistas of Architectural entrepreneurship in the 21st century environment to generate innovative business models

#### **COURSE DETAILS:**

- **Unit 1: Developing the mind-set of being an entrepreneur**
  - Meaning and concept of entrepreneurship, ~~history of entrepreneurship development~~, role of entrepreneurship in economic development, factors affecting entrepreneurship, Types of entrepreneurs, examples & barriers to entrepreneurship. Skills of leadership, leaving the 'employee mentality' & developing the entrepreneur mindset.
  - Introduction to the concept of "*Intrepreneurship*"

#### **Assignment 01: Essay writing (1500 - 2000 words)**

- **Unit 2: Basics of Business Management**  
Entrepreneurship, business management, finance and IPR
  - Fundamentals of Business - types of professional organizations -
  - Basics of Accountancy and Finance Management, & Investment planning
  - Introduction to business planning, understanding market needs, gaining marketing intelligence, survey and analysis of efficiency and productivity, market analysis, risk assessment, managing competition, etc.
  - Introduction to Intellectual Property Rights
- **Unit 3: Basic Entrepreneurial Skills Development**
  - Need to practice: Why practice? Where to start? Who to look at? What to look for?
  - Introduction to the changing face of Architectural Practice & the scope of diversification into activities allied to Architecture
  - Introduction to Lateral thinking and developing problem solving approach
  - Basics of People (HR) Management -
  - Importance and ways of Team Building
  - Importance of Time management
  - Need for developing Software skills
- **Unit 4: Developing a Business Model**  
New vistas of architectural entrepreneurship in the 21st century environment to generate innovative business models



- Developing a Business Model: Understanding the importance of Team, steps to create Business Models, types of Models and finally creating a product that is market ready.
- Exposure to Case Studies of Entrepreneurs and their journeys

### **SESSIONAL WORK**

- Totally 3 assignments to be done for this course.
- One assignment to mandatorily cover two Case Studies of entrepreneurs (One Architectural and the other allied) done individually and to be presented as seminar to the class
- Choice of other two assignments can be done individually or in a group of two (as per Units) is left to the discretion of the individual college. Considering this is a Semester X subject, the faculty is expected to set out the broad contour and sub-aspects (including basic principles, role play, case studies, application in Professional Field, etc.) of the said subject of Entrepreneurship Development
- The students are expected to present the work done in an A4 report format of minimum 25 pages, to include summary of interactions, essays, Class notes, Case Studies and Sessional work prescribed by the faculty with a signed certificate from the concerned Teacher / Expert stating that the study was carried out under his /her guidance, and countersigned by the Principal / Academic coordinator

### **RECOMMENDED READINGS:**

1. **Manual of Architectural Practice** – Council of Architecture publication- Vol 1&5
2. How to Win Friends and Influence People by Dale Carnegie
3. Who Moved My Cheese? by Spencer Johnson
4. Thinking, Fast and Slow by Daniel Kahneman
5. The 4-Hour Workweek by Timothy Ferriss
6. The Art of Non-Conformity by Chris Gillebeau
7. The Entrepreneur Mind by Kevin D. Johnson
8. Design-Centered Entrepreneurship By Min Basadur, Michael Goldsby
9. Architect and Entrepreneur: A Field Guide to Building, Branding, and Marketing
10. Jab, Jab, Jab, Right Hook: How to Tell Your Story in a Noisy Social World by Gary Vaynerchuk
11. Lateral Thinking - Edward De Bono
12. Fundamentals of Intellectual property Rights- Ramkrishna B and Anilkumar H.S

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<b>ELECTIVE VI</b>		
Course Code	4201957 [SS]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 3 (Lecture: 1, Studio :2)	Sessional (internal)	25
	Sessional (external)	25
	Viva (internal)	NIL
	Viva (external)	NIL
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	50
	Total Credits	02

### **COURSE OBJECTIVES**

The elective is offered preferably as an open elective but if it is not possible to offer an open elective the colleges may offer an elective which the student has not undertaken earlier.

To allow the students to study a subject of their interest and develop theoretical as well as practical understanding of the same

As mentioned in the course structure of 2019 pattern syllabus [Appendix B] a student may adhere to a particular stream of elective of his/her choice and nurture his/her area of interest and develop his/her expertise.

However, colleges have to ensure that the student does not repeat a particular elective.

### **COURSE OUTLINE:**

Colleges have to develop course outline for the elective they wish to offer such that theoretical as well as practical aspects are covered linking them to the field of architecture.

Apart from lectures delivered by the subject resource persons, self-study in form of hands-on workshop / field work/ review of literature / seminar or any suitable format of learning may be adopted.

### **SESSIONAL WORK:**

- The submission to be devised by the colleges in form suitable to the elective offered. The format could be [but not limited to] as following.
- Field study reports
- Mapping / documentation / photographic / video graphic documentation
- Measured drawings
- Computer based assignments
- Tutorials

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# **SAVITRIBAI PHULE PUNE UNIVERSITY**

## **COURSE STRUCTURE**

**FIVE YEAR DEGREE COURSE IN ARCHITECTURE**

**[B.ARCH.]**

**TO BE IMPLEMENTED FROM 2015-16**

**BOARD OF STUDIES IN ARCHITECTURE**

**FACULTY OF ENGINEERING**



# SAVITRIBAI PHULE PUNE UNIVERSITY

## BACHELOR OF ARCHITECTURE

### COURSE STRUCTURE AND RULES

#### Preamble

The New Syllabus of the B.Arch course hence forth to be referred as the 2015 Pattern, to be implemented from the year 2015-16, is designed to address and update the knowledge about the field. The course focuses to develop the design ability, impart knowledge about various aspects of architecture and develop various skill sets. Considering this certain subjects are reduced in scope while certain new subjects are added.

As per the University guidelines, the course is structured upon the Credit System Based Assessment. In semester and End semester assessment is introduced for theory paper subjects and at end of the semester sessional assessment for studio based subjects.

Following are the salient features of the course content.

- To bridge the gap between learning Basic Design and its application in Architectural Design, a comprehensive subject titled as “Design” is introduced where in there is simultaneous and synchronized learning of basic design and architectural design fundamentals in the first two years of the course.
- “Introduction to Architecture” a one semester (first semester) course would give an overview of the discipline of architecture as well as the structure of five-year course.
- “Humanities” as a separate subject is introduced to enable the understanding of human culture, society and civilisations and prepare a base for learning the history of architecture in the later semesters. The subject should be taught from the perspective of architecture.
- “Urban Studies” in the fourth year (both the semesters) is a comprehensive subject integrating urban planning, urban design, architectural conservation & byelaws. An introduction to building economics is also included in the course content.
- “Research in Architecture I” would introduce the students to the research methodology and research methods while in “Research in Architecture II” the students would undertake a research project to employ the knowledge they gained in the first leg of this subject.
- “Electives” are introduced from sixth semester onwards. The subjects / topics of the elective are thematically grouped: Sixth semester Elective I (Interior design elective), Seventh semester Elective II (Design and Technology



elective), Eighth semester Elective III (Allied elective) and Tenth semester Elective IV (Management Elective).

**Rule no.1: ELIGIBILITY FOR ADMISSION.**

Eligibility Criteria: Students seeking admission to First year of Bachelor's degree course in Architecture must fulfill the eligibility criteria laid down by University of Pune / Govt. of Maharashtra / Council of Architecture as applicable from time to time.

**Rule no.2: SCHEME OF ASSESSMENT.**

A candidate to be eligible for the degree of Bachelor of Architecture will be required to appear for and pass examinations as under:

**Examination Consisting of**

**STAGE I (Total credits of Stage I = 144)**

1. I B.Arch. Semester I & II exams
2. II.B.Arch Semester III & IV exams
3. III.B.Arch. Semester V & VI exams

**STAGE II (Total credits of Stage II = 70)**

4. IV B.Arch. Semester VII & VIII exams
5. V B.Arch. Semester IX & X exams

**Total Credits of the Course = Stage I + Stage II = 214**

**Rule no. 3: GRANTING OF TERM.**

Academic year shall consist of two semesters of 90 teaching days each. Sessional work completed by the students shall be continuously assessed internally during the term and assessed at the end of the academic term jointly by the internal and external examiners. The candidate will be permitted to appear for examination **only** if he/she produces testimonials from the Principal of the College for :

1. 75% attendance in each head of passing of theory and/ or sessional work as prescribed by the University.
2. Satisfactory completion of the sessional work prescribed for each subject and securing minimum 45% marks in the Internal assessment for the same.
3. Good Conduct.

**Rule no. 4: PREREQUISITES FOR ADMISSION TO HIGHER CLASSES.**

A student shall be promoted to higher class only if he/she has scored minimum 45 % marks in each theory / sessional / sessional and viva-voce head and minimum 50% aggregate.





### **For admission to Stage II of the course:**

1. Candidates admitted to the course shall complete the first stage within five years of admission to the course.
2. The aggregate marks of F.Y, S.Y., and T.Y. at the end of Stage I should not be less than 50%.

### **Rule no. 5 : Rules of Passing**

- 5.1 To pass sessional and /or oral, the student has to earn minimum 45% marks in each head.
- 5.2 To pass the theory subject head the student has to earn minimum of 45% marks in the End semester exam and minimum 45% average marks (In semester + End semester).
- 5.3** The failing student can repeat the end semester exam to pass the head in any semester and the In semester exam marks will be retained as it is. Or the failing student can repeat for end semester exam as well as in semester exam for the head of even semester in the even semester only and for the head of odd semester in the odd semester only for the theory head.
- 5.4 To earn credits of a course (paper/sessional/oral) student must pass the course with minimum passing marks / grade.
- 5.5 Student can apply only for the revaluation / photocopying / verification of answer sheets of End semester exam only.

### **Rule no. 6: RULES OF A.T.K.T.**

1. A student can be admitted for the third semester if he/she earns minimum **50%** credits of the total of first and second semester.
2. A student can be admitted for the fifth semester if he/she earns minimum **50%** credits of the total of third and fourth semester and all the credits (**100%**) of the first and second semester and passing grade of aggregate for first year.
3. A student can be admitted for the seventh semester if he/she earns minimum **50%** credits of the total of the fifth and sixth semesters and all the credits (**100%**) of the third and fourth semesters and passing grade of aggregate for second year.
4. Fourth Year and Final Year are considered as integrated Stage II of the course and hence students will be allowed to take admission to Fifth year irrespective of the credits earned by the student in seventh and eighth semesters.
5. A student would be awarded B.Arch. only if he/she earns 214 (100%) credits and clears all the courses specified in the syllabus and gets passing grade of aggregate.



## Rule no. 7: ASSESMENT AND GRADE POINT AVERAGE

**7.1** A grade assigned to each head based upon marks obtained by the student in examination of the course.

**Table 1**

### GRADING SYSTEM FOR PASSING HEADS (theory / sessional / sessional-viva)

Grade	Grade Points	% of Marks Obtained	Remarks
O	10	90-100	Outstanding
A	9	80-89	Very good
B	8	70-79	Good
C	7	60-69	Fair
D	6	50-59	Average
E	5	45-49	Below average
F	0	Below 45	Fail

**Table 2**

### GRADING SYSTEM FOR AGGREGATE

Grade	Grade Points	% of Marks Obtained	Remarks
O	10	90-100	Outstanding
A	9	80-89	Very good
B	8	70-79	Good
C	7	60-69	Fair
D	6	50-59	Average
F	0	Below 50	Fail

**7.2 Passing grades for various heads:** The grades O,A,B,C,D & E are passing grades for various heads (paper / sessional / sessional viva voce). A candidate acquiring any one of these grades in a course shall be declared as pass only in that particular subject head. And student shall earn the credits for a course only if the student gets passing grade in that course (which includes paper and/or sessional and/ or sessional viva voce).

**7.3 Passing grades for Aggregate :** The grades O,A,B,C & D are passing grades in the aggregate.

**7.4 F grade for various heads:** The grade F is a failure grade. The student with F grade will have to pass the concerned course by reappearing for the examination.

**7.5 F grade for aggregate:** The grade F is a failure grade for aggregate. The student with F grade will have to appear for paper &/ or sessional & /or session viva voce for improvement of aggregate.



## Rule no. 8: EXAMINATIONS.

- i. Paper **and/ or**
- ii. Sessional / Sessional and Viva-voce based on sessional work, as prescribed in the subjects will be treated as **separate heads of passing**.

### 8.1 Structure of Theory Paper Examinations

The theory Examination shall be conducted in two phases for the subjects as indicated in the structure viz.: In Semester Examination and End Semester examination. The structure detailing the time, mode of syllabus coverage, maximum marks etc is given below. This structure of examinations shall be followed by the regular candidates :-

Phase of examination	Time	Mode	Syllabus Coverage	Duration	Max. Marks
In semester	End of 6 <sup>th</sup> week	Written	Unit I & II	60 minutes	30
End Semester	End of Semester	Written	All Units	150 minutes	70

The detail examination schedule shall be decalred at the beginning of the semester by the Savitribai Phule Pune University.

## Rule no. 9: CONDUCT OF EXAMINATIONS.

- 9.1 All the examinations will be conducted at University level.
- 9.2 In-Semester Examination : Shall be carried out at concerned college by appointing examiners from the panel given by the 32/5 committee of the University and the result to be conveyed to the University.
- 9.3 End-Semester Examination : Shall be carried out at concerned college as per the University schedule of examination program and the question paper will be made available by the University.

## Rule no. 10: Assesment

- 10.1 **In-semester Examination Assessment** will be done at the College by the expert who is appointed as the examiner for the subject as per 32/5 Panel of the In-semester exam.
- 10.2 **End-Semester Examination Assessment** will be done at the CAP center by the Expert(s) appointed as the examiner for the subject as per 32/5 Panel of the End-semester exam for Third to Fifth Yr.



### 10.3 SESSIONAL WORK ASSESSMENT.

- a. The sessional and /or oral examinations is to be conducted and assessed jointly by external and internal examiner approved by the University.
- b. In respect of Sessional work at F. Y. B.Arch., S. Y. B.Arch., T. Y. B.Arch. Fourth Yr. B.Arch and Fifth Year B.Arch. target date shall be fixed for the completion of each assignment and the same shall be competed and collected on the fixed target date. All assignments shall be continuously assessed by the teacher during semester.
- c. At the end of each semester sessional work shall be assessed jointly by the internal and external examiners from amongst the panel approved by the University.
- d. Performance of Sessional / Viva-voce Examination shall be assessed on the basis of understanding of the principles involved and not on the basis of mere correctness or results and ornamental or colourful presentation.
- e. Drawings and reports / notes shall be manually prepared. Students may use computers for sessional work under the guidance of the teachers where nature of work is individual and stress is on content rather than skill. The work done by the students has to be authenticated for its originality by the concerned teachers.
- f. At all the examinations **except** for the SEMESTER X : ARCHITECTURAL PROJECT, external assessment shall be carried out by Internal teachers from other college in the University not teaching that or any other subject in the institute where the examination is being conducted.
- g. For tenth semester Architectural Project an external examiner means a professional not teaching in any of the colleges under University of Pune.
- h. Internal Examiner : Internal Examiner is one who is teaching that particular subject in the same/any other college under University.
- i. An Examiner for any of the subjects of examination from 1st year to 3rd. Year Architecture, shall have a minimum of 3 years teaching / professional experience in his/her field of study.
- j. An Examiner for any of the subjects of examination for 4th year and Final Year Architecture, shall have a minimum of 5 years teaching / professional experience in his/her field of study.
- k. To qualify for the External Examiner at the tenth semester Architectural Project, the professional shall have a minimum of five years professional experience.

### Rule no.11 : PERFORMANCE INDICES



1. The semester end grade sheet will contain grades for the course along with titles and SGPA. Final grade sheet and transcript shall contain CGPA.
2. **SGPA** : The performance of a student in a semester is indicated by a number called the semester grade point average (SGPA). The SGPA is the weighted average of grade points obtained in all the courses registered by the student during the semester.

Semester Grade Point Average (SGPA) =

$$\begin{aligned}
 \text{SGPA} &= \frac{\sum_{i=1}^p C_i G_i}{\sum_{i=1}^p C_i} \\
 &= \frac{\sum \text{Grade Points earned} \times \text{Credits for each course}}{\text{Total Credits}}
 \end{aligned}$$

For example : Suppose in a given semester a student has registered for five courses having credits C1, C2, C3, C4, C5 and his / her grade points in those courses are G1, G2, G3, G4, G5 respectively,

Then the SGPA would be

$$\begin{aligned}
 \text{SGPA} &= \frac{C_1 G_1 + C_2 G_2 + C_3 G_3 + C_4 G_4 + C_5 G_5}{C_1 + C_2 + C_3 + C_4 + C_5}
 \end{aligned}$$

**SGPA** is calculated up to two decimal places by rounding off.

3. **CGPA** : The CGPA is the weighted average of the grade points obtained in all the courses (theory /sessional /vivavoce) of **seventh, eighth, ninth and tenth** semesters. It is calculated in the same manner as the SGPA. It is calculated based upon the SGPA of the concerned semesters.

### Rule no. 12: RESULT

Based on the performance of the student in the semester examinations, the Savitribai Phule Pune University will declare the results and issue the Semester grade sheets.

The class shall be awarded to a student on the CGPA calculated in rule no. 11(3). The award of the class shall be as per the table no. 3 below.



**Table 3**

<b>Sr.No.</b>	<b>CGPA</b>	<b>Class of the degree awarded</b>
1	7.75 or more than 7.75	First class with distinction
2	6.75 or more but less than 7.75	First class
3	6.25 or more but less than 6.75	Higher second class
4	5.5 or more but less than 6.25	Second class

**Rule no. 13: EXEMPTIONS**

In case a candidate fails in an examination but desires to appear again,

- a) Examinations will be held in Oct. / Nov. & Apr / May.
- b) He/ She may be exempted from appearing in the head/s of passing in which he/she has passed.
- c) The students failing to get minimum passing grade for aggregate in a year can also appear for the examinations (paper and/or sessional and/or sessional-vivavoce) to enhance their marks in maximum four heads.

**Rule no. 14: INTRODUCTION OF THIS CURRICULUM.**

The new curriculum for the Degree course in Architecture B.Arch will be introduced gradually as under:

- a) First Yr. B. Arch. course from June 2015
- b) Second Yr. B. Arch. course from June 2016
- c) Third Yr. B. Arch. course from June 2017
- d) Fourth Yr. B. Arch. course from June 2018
- e) Final Yr. B. Arch. course from June 2019

**Note :** The B.Arch. course introduced in June 2015 would be conducted by the University for 10 consecutive years since inception for the Students admitted between June 2015 to June 2019. However the student has to pass the first stage of this course in maximum five years since admission.

**Rule no. 15: OTHER RULES.**

University may frame additional rules and regulations or modify these regulations if needed and once approved by the University they would be binding on the students.



# COURSE STRUCTURE

## FIVE YEARS DEGREE COURSE

### BACHELOR OF ARCHITECTURE

As per the Council of Architecture guidelines approx. 75% course curriculum is prescribed. While remaining may be as per the individual philosophy of the institute. A total of 40 periods (45 min duration) per week per term shall be conducted for the course. Out of these 36 periods are specified below. 4 periods per week are given to the institutions to orient the course as per their own philosophy. Intensive study as per the institution's philosophy may also be done in addition to the detail syllabus in each subject.

The periods considered for calculating the teaching load are of 45 min duration. The credit calculation is based upon 60 minutes amounting to one credit.

Considering the peculiarity of Architecture Education, the studio load is considered equal to the lecture load as one to one contact with the students is desirable and hence credits are calculated by considering full load of lecture and studio periods.

The detail structure of the syllabus for the ten semesters course is given below.

**(Note : SS= Sessional work ; PP=theory Paper ; SV = Sessional + Viva voce)**

#### FIRST YEAR B.ARCH. SEM. I

Code	Subject	Teaching Scheme Periods/Week		Examination Scheme				Total Marks	Credits
		Lecture	Studio	In Semester	Sessional	Oral	End Semester		
1201501	Design I	3	7	--	200	50	--	250	7
1201502	Building Technology & Materials I (SV)	3	4	30			70	200	5
1201503	Building Technology & Materials I (PP)			50	50				
1201504	Theory of Structures I (PP)	1	2	30			70	100	2
1201505	Arch Drawing & Graphics I	2	5	--	100	--	--	100	4
1201506	Humanities	2	1	--	50	--	--	50	2
1201507	Introduction to Architecture	2	1	--	50	--	--	50	2
1201508	Workshop I	1	2	--	50	--	--	50	2
		14	22					<b>800</b>	<b>24</b>



### FIRST YEAR B.ARCH. SEM. II

Code	Subject	Teaching Scheme Periods/Week		Examination Scheme				Total Marks	Credits
		Lecture	Studio	In Semester	Sessional	Oral	End Semester		
1201509	Design II	3	7	--	200	50	--	250	7
12015010	Building Technology & Materials II(SV)	3	4	30			70	200	5
12015011	Building Technology & Materials II (PP)				50	50			
1201512	Theory of Structures II	1	2	30			70	100	2
1201513	Arch Drawing & Graphics II	2	5	--	100	--	--	100	4
1201514	History of Architecture I	2	1	--	50	--	--	50	2
1201515	Climatology	2	1	--	50	--	--	50	2
1201516	Workshop II	1	2	--	50	--	--	50	2
		14	22					<b>800</b>	<b>24</b>

### SECOND YEAR B.ARCH. SEM. III

Code	Subject	Teaching Scheme Periods/Week		Examination Scheme				Total Marks	Credits
		Lecture	Studio	In Semester	Sessional	Oral	End Semester		
2201517	Design III	3	8	--	200	50	--	250	7
2201518	Building Technology & Materials III(SV)	3	4	30			70	200	5
2201519	Building Technology & Materials III(PP)				50	50			
2201520	Theory of Structures III	1	2	30			70	100	2
2201521	Building Services I (SS)	2	2		50			150	3
2201522	Building Services I (PP)			30			70		
2201523	History of Architecture II	2	1	--	50	--	--	50	2
2201524	Arch Drawing & Graphics III	2	3	--	100	--	--	100	3
2201525	Surveying & Levelling	1	2	--	50	--	--	50	2
		14	22					<b>900</b>	<b>24</b>





## SECOND YEAR B.ARCH. SEM. IV

Code	Subject	Teaching Scheme Periods/Week		Examination Scheme				Total Marks	Credits
		Lecture	Studio	In Semest er	Sessional	Oral	End Semester		
2201526	Design IV	3	8	--	200	50	--	250	7
2201527	Building Technology & Materials IV(SV)	3	4	30			70	200	5
2201528	Building Technology & Materials IV (PP)				50	50			
2201529	Theory of Structures IV	1	2	30			70	100	2
2201530	Building Services II (SS)	2	2		50			150	3
2201531	Building Services II (PP)			30			70		
2201532	History of Architecture III	2	1	--	50	--	--	50	2
2201533	Technical Communication	1	2		50			50	2
2201534	Working Drawing I	2	3		100			100	3
		<b>14</b>	<b>22</b>					<b>900</b>	<b>24</b>

## THIRD YEAR B.ARCH. SEM. V

Code	Subject	Teaching Scheme Periods/Week		Examination Scheme				Total Marks	Credits
		Lecture	Studio	In Semeste r	Sessional	Oral	End Semester		
3201535	Design V	3	8	--	200	50	--	250	7
3201536	Building Technology & Materials V(SV)	3	4	30			70	200	5
3201537	Building Technology & Materials V (PP)				50	50			
3201538	Theory of Structures V	1	2	30			70	100	2
3201539	Landscape Architecture I	1	3		50			50	2
3201540	Building Services III (SS)	2	2		50			150	3
3201541	Building Services III (PP)			30			70		
3201542	History of Architecture IV	2	1	--	50	--	--	50	2
3201543	Working Drawing II	2	2		100			100	3
		<b>14</b>	<b>22</b>					<b>900</b>	<b>24</b>



### THIRD YEAR B.ARCH. SEM. VI

Code	Subject	Teaching Scheme Periods/Week		Examination Scheme				Total Marks	Credits
		Lecture	Studio	In Semester	Sessional	Oral	End Semester		
3201544	Design VI (SV)	3	8	--	200	50		350	7
3201545	Design VI (PP)			--	--	--	100		
3201546	Building Technology & Materials VI(SV)	3	4	30			70	200	5
3201547	Building Technology & Materials VI (PP)				50	50			
3201548	Theory of Structures VI	1	2	30			70	100	2
3201549	Landscape Architecture II	1	3		50			50	2
3201550	Building Services IV(SS)	2	2		50			150	3
3201551	Building Services IV (PP)			30			70		
3201552	Contemporary Arch Seminar	1	3	--	50	--	--	50	3
3201553	Elective I	1	2		50			50	2
		12	24					<b>950</b>	<b>24</b>

### FOURTH YEAR B.ARCH. SEM. VII

Code	Subject	Teaching Scheme Periods/Week		Examination Scheme				Total Marks	Credits
		Lecture	Studio	In Semester	Sessional	Oral	End Semester		
4201554	Design VII	3	9		200	50		250	8
4201555	Advanced Building Technology and Services I	3	4		150	50		200	5
4201556	Professional Practice I	1	2	30			70	100	2
4201557	Urban Studies I	1	2		50			50	2
4201558	Research in Architecture I	1	2		50			50	2
4201559	Quantity Surveying and Estimation I	1	2	30			70	100	2
4201560	Specification Writing I	1	2	30			70	100	2
4201561	Elective II	1	1		50			50	1
		12	24					<b>900</b>	<b>24</b>



### FOURTH YEAR B.ARCH. SEM. VIII

Code	Subject	Teaching Scheme Periods/Week		Examination Scheme				Total Marks	Credits
		Lecture	Studio	In Semester	Sessional	Oral	End Semester		
4201562	Design VIII	3	9		200	50		250	8
4201563	Advanced Building Technology and Services II	3	4		150	50		200	5
4201564	Professional Practice II	1	2	30			70	100	2
4201565	Urban Studies II	1	2		50			50	2
4201566	Research in Architecture II	1	2		50			50	2
4201567	Quantity Surveying and Estimation II	1	2	30			70	100	2
4201568	Specification Writing II	1	2	30			70	100	2
4201569	Elective III	1	1		50			50	1
		12	24					<b>900</b>	<b>24</b>

### FIFTH YEAR B.ARCH. SEM. IX

Code	Subject	Teaching Scheme Periods/Week		Examination Scheme				Total Marks	Credits
		Lecture	Studio	In Semester	Sessional	Oral	End Semester		
5201570	Practical Training	--	--	--	150	50	--	200	8
		--						<b>200</b>	<b>8</b>

### FIFTH YEAR B.ARCH. SEM. X

Code	Subject	Teaching Scheme Periods/Week		Examination Scheme				Total Marks	Credits
		Lecture	Studio	In Semester	Sessional	Oral	End Semester		
5201571	Architectural Design Project	4	16	--	350	100	--	450	12
5201572	Elective IV	1	2		50			50	2
		5	18					<b>500</b>	<b>14</b>



# **SAVITRIBAI PHULE PUNE UNIVERSITY**

## **DETAILED SYLLABUS OF FIRST YEAR**

**[B.ARCH.]**

**TO BE IMPLEMENTED FROM 2015-16**

**BOARD OF STUDIES IN ARCHITECTURE  
FACULTY OF ENGINEERING**



# DESIGN I

Design I			
Subject Code		1201501	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3 Studio=7)	10	Sessional (Internal)	100
		Sessional (External)	100
		Viva (Internal)	25
		Viva (External)	25
		In semester exam	NIL
		End Semester exam	NIL
		Total Marks	250
		Total Credits	7

## COURSE OBJECTIVES:

- To introduce the students to the fundamentals and principles of basic design and to enable them to undertake design by application of basic design principles.
- To comprehend Design as a creative process of choice making and statement of intent.

## COURSE OUTLINE:

- Creation, creativity and motivation for architects. Relationship between visual aesthetics, design and creativity.
- Elements of Composition: Study of Point, Lines, Planes, Shapes, Material and Texture, Colour, Light etc.
- Principles of Composition: Alignment, Repetition, Pattern, Rhythm, Balance, Hierarchy, Focus, Axis, Emphasis, Juxtaposition, etc.
- Scale, proportion and anthropometry and spatial experience.
- Attributes of Form and Space, Forms in Nature, Platonic Forms, Derivative forms and transformation. Principles of Organization of Form & Space.
- Activation of space, Positive and Negative space; Relationship to location of composition with surroundings.
- Study and analysis of small scale built structure with respect to its context, comfort, function anthropometrical data, and space layout.

## SESSIONAL WORK:

- Minimum 8 tasks based upon elements and principles of composition on A3 sheets and/or models.
- Minimum one simple spatial design exercise such as seating area in public space, bus shelter, kiosks, play area, entrance gate etc. demonstrating the application of the design principles and communicated effectively through two and three-dimensional hand done drawings, sketches and models.

## RECOMMENDED READINGS

- Ching Francis D. K., Form Space and Order.
- Ching Francis D. K., A Visual Dictionary of Architecture.
- John R. Mather -Climatology: Fundamentals and Application.
- Christopher Alexander- Pattern Language.
- Robert Sommer. -Design Awareness.
- C.M. Deasy -Design for Human Affairs.
- Pierre Von Meiss -Elements of Architecture from form to place.
- Yatin Pandya- Elements of Space Making
- Paul Lassau – Graphic Thinking for Architects and Planners.



# BUILDING TECHNOLOGY AND MATERIALS I

<b>BUILDING TECHNOLOGY AND MATERIALS I</b>			
Subject Code		1201502(SV) 1201503(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3 Studio=4)	7	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	25
		Viva (External)	25
		In semester exam	30
		End Semester exam	70
		Total Marks	200
		Total Credits	5

## COURSE OBJECTIVES

- To help students understand the basic building elements, their function and behavior under various conditions with specific reference to load bearing construction.
- To help students to develop a clear understanding of the basic principles of construction and materials suitable for load bearing construction.
- To help students develop an analytical and logical sequence in thinking about structural aspects of architecture.
- To encourage a mix of classroom and field learning.

## COURSE CONTENTS:

### Unit 1

Introduction to various elements of building from foundation to roof.

### Unit 2

2.1 Principles of load bearing construction.  
 2.2 Introduction to various building materials which are commonly used in load bearing construction like stone, brick, concrete blocks, mud blocks, etc. with reference to their characteristics, market forms, applications and common quality tests. Cement and cement mortar.

### Unit 3

3.1 Different types of soils and bearing capacity, concept of bulb of pressure.  
 3.2 Strip Foundations suitable for load bearing structures in stone and brick upto plinth level including foundation for steps  
 3.2 Plinth formation, DPC.  
 3.3 Introduction to various tools and equipment commonly used in excavation.

### Unit 4

4.1 Load bearing and non- load bearing masonry construction using various masonry materials, various types of masonry walls and bonds.  
 4.2 Study of types of arches and lintels, principles and terminology of arch construction, spanning of openings using brick and stone arches and lintels.

### Unit 5

Various pointing and plastering techniques and their processes.

### Unit 6

Introduction to types of earthquakes and earthquake resistant measures for load bearing construction.



## SESSIONAL WORK

Hand drawn drawings on Units 3 and 4; Assignments on units 1, 2, 5 and 6.

## RECOMMENDED READINGS

1. 'Elements of Structure' by Morgan
2. 'Structure in Architecture' by Salvadori
3. 'Building Construction' by Mackay W. B., Vol. 1 – 4
4. 'Building Construction' by Barry, Vol. 1 – 5
5. 'Construction Technology' by Chudley, Vol. 1 – 6
6. 'Building construction Illustrated' by Ching Francis D. K.
7. 'Elementary Building Construction' by Michell
8. 'Structure and Fabric' by Everet
9. 'Engineering Materials' by Chaudhary
10. 'Building Construction Materials' by M. V. Naik
11. 'Civil Engineers' Handbook' by Khanna
12. 'Vastu Rachan' by Y. S. Sane
13. National Building Code and I.S.I. Specifications
14. 'Materials and Finishes' by Everet
15. 'A to Z Building Materials in Architecture' by Hornbostle

## THEORY OF STRUCTURES I

THEORY OF STRUCTURES I			
Subject Code		1201504	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1 Studio=2)	3	Sessional (Internal)	NIL
		Sessional (External)	NIL
		Viva (Internal)	NIL
		Viva (External)	NIL
		In semester exam	30
		End Semester exam	70
		Total Marks	100
		Total Credits	2

### COURSE OBJECTIVES:

- To Introduce Applied Mechanics as an important Subject for Architecture.
- To Understand Different Systems of Forces and their Equilibrium and that a Building is a System of Forces in Equilibrium.
- To Introduce and Understand Concepts of Support, Support Reactions, Beams, Loads, Bending and Shear.

### COURSE OUTLINE:

#### Unit 1. Forces.

1. Applied Mechanics, Statics and Dynamics. Importance of Study.
2. Forces, Definition, Effects, Different Systems, Principle of Transmissibility and Superimposition of Forces. Resolution and Composition of Forces.
3. Equilibrium of Concurrent Forces. Parallelogram, Polygonal & Triangular Law of Forces. Lami's Theorem. Analytical and Graphical Solution of Forces. Resultant and Equilibrant of a System of Concurrent Forces.
4. Equilibrium of Non Concurrent Forces. Varignon's Principle. Resultant of a system of noncurrent forces as in a beam.



## **Unit 2. Centre of Gravity.**

1. Definition of Centre of Gravity and Centroid. C.G of Regular Shapes. Computing of C.G of complex Shapes limited to Standard Steel Sections like C, T, L, I and Compound Sections.

## **Unit 3. Moment of Inertia**

1. Definition of Moment of Inertia and M.I of Standard Shapes. Parallel Axis Theorem, Perpendicular Axis Theorem, Radius of Gyration. Computing M.I of Complex Shapes Limited to C,T,L,I and Compound Sections using these Shapes.

## **Unit 4. Supports and Loads**

1. Supports, Definition, Reactions offered by Simple, Fixed, Hinged and Roller Support.
2. Statically Indeterminate and Determinate Structures and Degree of Indeterminacy. Beams classified as Simply Supported, Cantilever, Over Hanging, Propped Cantilever, Fixed and Continuous.
3. Loads Classified as U.D.L, Point Load & Varying Load.
4. Loads Classified as Dead, Live, Wind, Snow, Seismic. Introduction to Densities of Material and Calculation of Dead loads on a Beam from slab, Brick work above to act as U.D.L and from a abutting beam as a Point Load
5. Support Reactions. For Simply Supported Beams and Cantilevered Beams only. Loading limited to Point Loads and U.D.L only.

## **Unit 5. S.F.D and B.M.D - 1**

1. Shear Force and S.F.Diagram & B.M.D and B.M.Diagram for :: Simple Support with an U.D.L., Simple Support with a Central Point Load, Simple Support with an eccentric point Load, Cantilever with a full U.D.L, Cantilever with a Point Load.

## **Unit 6. S.F.D and B.M.D - 2**

1. S.F.D and B.M.D of a Simple Supported Beam and Over Hanging Beams with U.D.L and Point Loads. Point of Zero Shear, Point Of Max S.F and B.M max. Point of Contra flexure.
2. Relationship between S.F.D and B.M.D.

## **RECOMMENDED READINGS**

1. Design of steel structures-Vazirani – Rathwani.
2. Design of steel structures- L.S. Negi.
3. R.C.C. Design – Khurmi, Punmia, Sushilkumar.
4. Elements of Structures – Morgan.
5. Structure in Architecture – Salvadon and Heller.
6. Structure Decisions – F. Rosenthal.
7. Strength of Materials by Amol Dongre





# ARCHITECTURAL DRAWING AND GRAPHICS I

<b>ARCHITECTURAL DRAWING AND GRAPHICS I</b>			
Subject Code		1201505	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2 Studio=5)	7	Sessional (Internal)	50
		Sessional (External)	50
		Viva (Internal)	NIL
		Viva (External)	NIL
		In semester exam	NIL
		End Semester exam	NIL
		Total Marks	100
		Total Credits	4

## COURSE OBJECTIVES:

- To introduce students to architectural drawing techniques and to the language of graphics, its vocabulary and grammar such as scale, annotations, labelling and dimensioning.
- To enable students to express simple three dimensional objects and building components through Technical Drawings, using various graphic projection systems such as orthography, Isometric and Axonometric projections.
- To introduce various techniques of sketching for recording, studying and communicating objects, buildings and building components.

## COURSE OUTLINE:

**Unit 1** Introduction to various drawing instruments and methods of employing them for technical drawing and sketching.

**Unit 2 Introduction to graphic language and its components:**

- Line types: meaning and application
- Architectural Lettering and dimensioning techniques
- Architectural annotations and conventions including representation of various building materials and building components
- Graphic scales and their application

**Unit 3 Plane and Solid geometry:**

- Introduction to graphical construction of various plane geometrical shapes.
- Introduction to various projection systems used in Architectural drawing; such as Orthographic, Isometric and Axonometric projections to draw and represent various three dimensional geometrical objects/forms including Section/s.

**Unit 4 Scale Drawing:**

- Scale drawing (plan/s section/s and elevation/s) of a simple building of sufficient size to demonstrate use of various metric scales, conventions and standard annotations.

**Unit 5 Sketching:**

- Introduction to architectural sketching using various mediums such as graphite pencil, charcoal, pens, markers etc.
- Principles of free hand sketching such as proportions, light and shade; with primary thrust on sketching of building elements and built environment.



## SESSIONAL WORK:

- Sessional work should be planned to cover all the units mentioned in course outline with thrust on skill development, accuracy and understanding of the topic.
- Twenty five percent weightage in assessment should be given to the assignments of sketching
- Minimum of Eight manually drafted assignments to cover the course outline based on the following modules:

a	Architectural scales and annotations	2 to 3 Assignments
b	Orthographic (plan, section/s, elevation/s) isometric, axonometric projections of three dimensional objects and building components	5 Assignment
c	Scale drawing of building/s of sufficient size to demonstrate basic building components, standard annotations.	1 to 2 Assignments

## RECOMMENDED READINGS

1. Ching Francis D.K.: Architectural Graphics
2. Kelsey W. E.: Geometrical & Building Drawing
3. Leslie Martin: Architectural graphics:
4. B. James: Essential of Drafting
5. H. Joseph and Morris: Practical plane and solid geometry
6. Gill Robert: Rendering with pen and ink
7. Burden Ernest: Architectural Delineation

## HUMANITIES

HUMANITIES			
Subject Code		1201506	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2 Studio=1)	3	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

## COURSE OBJECTIVE

- To introduce the students to the study of humanities and its importance in understanding of human settlements and architecture.

## COURSE OUTLINE

- To introduce the disciplines of study such as anthropology, sociology, linguistics, philosophy, history, political science and understand their connection with understanding of architecture.
- To introduce the students to the aspects of human society, civilisation and culture.

## SESSIONAL WORK

- The sessional work shall comprise of minimum one tutorial and two assignments.

## RECOMMENDED READINGS

1. History of World Civilizations by J.E. Swain.
2. A Short History of the World – H.G.Wells
3. The Ascent of Man – J. Bronowski



# INTRODUCTION TO ARCHITECTURE

INTRODUCTION TO ARCHITECTURE			
Subject Code		1201507	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2 Studio=1)	3	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

## COURSE OBJECTIVES:

To introduce the students to the field of Architecture, its scope, and fundamentals.

## COURSE OUTLINE

- Introduction to the profession of architecture and its distinguishing characteristics with respect to other professions, trades and businesses.
- Scope of Architecture as a discipline and Architect as a professional.
- Fundamentals of architecture- function, form and structure, and their integration.
- Generators of architectural design- site, function, circulation, context, structural system and materials, aesthetic principles, sustainability.

## SESSIONAL WORK

- Minimum 3 individual assignments covering the generators of architectural design as mentioned above.

## RECOMMENDED READINGS

1. Architecture : Form, Space and Order – F.D.K.Ching
2. Design fundamentals in Architecture – Pramdar
3. A Visual Dictionary of Architecture - F.D.K.Ching

## WORKSHOP I

WORKSHOP I			
Subject Code		1201508	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2 Studio=1)	3	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

## COURSE OBJECTIVES:

- Introducing students to various materials and techniques used in making Architectural models.
- Enabling Students to make Architectural models for study and presentation.



**COURSE OUTLINE:**

- Introduction to various materials (such as paper, mount board, thermocol, foamboard, etc.) tools and techniques of architectural model making through construction of simple three dimensional objects and scaled building models.
- Models should preferably be co-ordinated with other subjects like 'Design', 'Building technology', 'Theory of Structure', 'History of Architecture and human settlement' etc.

**SESSIONAL WORK:**

- Sufficient number of assignments to cover the topics given below, with thrust on exploring maximum materials and techniques, understanding their appropriateness for the purpose and skill development.

a	Three dimensional objects	1 to 2 Assignments
b	Models based on Design projects	1 to 2 Assignments
c	Based on building technology topics	2 to 3 Assignments
d	Based on history of architecture and theory of structure	1 to 2 Assignment

**RECOMMENDED READINGS**

- John Taylor, Model Building for Architects and Engineers
- Rolf Janke, Architectural Models

\*\*\*\*

**DESIGN II**

<b>Design II</b>			
Subject Code		1201509	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3 Studio=7)	10	Sessional (Internal)	100
		Sessional (External)	100
		Viva (Internal)	25
		Viva (External)	25
		In semester exam	NIL
		End Semester exam	NIL
		Total Marks	250
		Total Credits	7

**COURSE OBJECTIVES:**

- To introduce the students to the iterative design process and various channels of creativity.

**COURSE OUTLINE:**

- To comprehend various design alternative processes like binary, cyclic, intuitive, bio-mimicry etc. and the importance of literature, humanities and case studies in the design process.
- To comprehend the symbiotic relationships between creativity, arts, crafts, environment, human spatial experience, structure with Design.
- Techniques of improving creativity in design such as brainstorming, mind maps, tree of possibilities, lateral thinking, matrix of ideas etc.
- Study of spaces: Positive and Negative Spaces, Human scale and user perception and experience of space.
- Activity & Spatial Relationship in terms of size, shape and volume of space; Concept of circulation and activity relationship diagrams.
- Study of a nearby rural, semi urban settlement / community for study, analysis and documentation of its built elements, open spaces and associated architectural character.



### SESSIONAL WORK:

- Minimum 6 number of assignments to cover the study of forms and spaces and principles of organization, scale and experience, etc. on A3 size sheets and/or models.
- Graphic documentation and analysis of the settlement study with sufficient individual work contribution.
- One spatial/ building design projects with single use spaces approximately 150-200 sq.m such as café, reading hall, parking layout, tourist facility, public toilet etc. preferably in the context of settlement/community study carried out and communicated effectively through graphical drawings, two and three-dimensional sketches, models and narratives.

### RECOMMENDED READINGS

1. Peter Pearce, Structure in Nature – Strategy for Design.
2. Peter Streeens, Patterns in Nature.
3. Anthony Antoniadis - Poetics in Architecture: Theory of design.
4. Am heim Rudolf, Visual Thinking.
5. John R. Mather -Climatology: Fundamentals and Application.
6. Maxwell Fry And Jane Drew -Tropical Architecture.
7. Paul Lassau - Graphic thinking for Architects and planners.
8. Jonathan A. Hale -Building Ideas. An introduction to Architectural Theory.

## BUILDING TECHNOLOGY AND MATERIALS II

BUILDING TECHNOLOGY AND MATERIALS II			
Subject Code		1201510(SV) 1201511(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3 Studio=4)	7	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	25
		Viva (External)	25
		In semester exam	30
		End Semester exam	70
		Total Marks	200
		Total Credits	5

### COURSE OBJECTIVES

- To help students understand the basic building elements, their function and behaviour under various conditions with specific reference to timber construction.
- To help students to develop a clear understanding of the basic principles of construction and materials suitable for load bearing construction.
- To help students develop and analytical and logical sequence in thinking about structural aspects of architecture.

### COURSE CONTENTS

#### Unit 1

- Construction of reinforced masonry walls, pillars and lintels

#### Unit 2

- Study of building materials like bamboo, timber, timber derivatives, roofing materials for small span sloping roofs including Mangalore tiles with reference to their characteristics, market forms, applications and preservation, etc.

#### Unit 3



- Various types of timber panelled and flush doors
- Various types of timber windows
- Hardware and carpentry tools used for timber fashioning, especially for doors and windows

#### Unit 4

- Single and double floor construction for G+1 building.

#### Unit 5

- Timber stairs and construction of any one type of stairs.

#### Unit 6

- Construction of various types of roofs for spans up to 6m
- Introduction to timber roof truss, king post and queen post trusses, built-up trusses, forces in truss members
- Masonry vaults and domes

### **SESSIONAL WORK**

Hand drawn drawings on Units 3, 4, 5 and 6; Assignments on units 1 & 2.

### **RECOMMENDED READING**

16. 'Elements of Structure' by Morgan
17. 'Structure in Architecture' by Salvadori
18. 'Building Construction' by Mackay W. B., Vol. 1 – 4
19. 'Building Construction' by Barry, Vol. 1 – 5
20. 'Construction Technology' by Chudley, Vol. 1 – 6
21. 'Building construction Illustrated' by Ching Francis D. K.
22. 'Elementary Building Construction' by Michell
23. 'Structure and Fabric' by Everet
24. 'Engineering Materials' by Chaudhary
25. 'Building Construction Materials' by M. V. Naik
26. 'Civil Engineers' Handbook' by Khanna
27. 'Vastu Rachan' by Y. S. Sane
28. National Building Code and I.S.I. Specifications
29. 'Materials and Finishes' by Everet
30. 'A to Z Building Materials in Architecture' by Hornbostle

## **THEORY OF STRUCTURES II**

<b>THEORY OF STRUCTURES II</b>			
Subject Code		1201512	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1 Studio=2)	3	Sessional (Internal)	NIL
		Sessional (External)	NIL
		Viva (Internal)	NIL
		Viva (External)	NIL
		In semester exam	30
		End Semester exam	70
		Total Marks	100
		Total Credits	2



## **COURSE OBJECTIVES:**

1. To Analyze the forces in a Frame.
2. To Study and analyze the stresses in various Building Elements like Columns and Beams.
3. To Study the deflection effect of loads on Beams.
4. To Study Combined Stresses on Eccentrically Loaded Columns and Apply the Same to the Design of Foundations of Load Bearing Walls.

## **COURSE OUTLINE.**

### **Unit 1. Simple Stresses and Strains**

1. Linear Stresses and Strains. Hooke's Law. Stress Strain Diagram for Various Materials. Lateral Strain, Poisson's Ratio, and . Elongation of Long Rods , Volumetric Strain, Bulk Modulus. Shear Stress. Modulus of Rigidity. Relationship between various Modulli. Composite Materials, Modulus Ratio and Equivalent Area e.g. R.C.C Column with Concrete and Steel.
2. Elastic, Plastic, Brittle and Ductile Materials. Yield Stress, Factor of Safety and Working or Permissible or Safe Stress.

### **Unit 2. Spanning Members.**

1. Bending Stresses. Theory of Simple Bending. Assumptions, Flexural Formula, Stress Distribution across a Section and across the span of the Beam. Modulus of Resistance. Section Modulus and how M.R is proportional to square of depth.
2. Shear Stresses. Formula, Shear Stress Distribution across a Rectangular, Circular, T, C, L, I Section.

### **Unit 3. Deflection.**

1. Deflection. Concept of Slope and Deflection. Double Integration Method and Derivation of Formula for a S.S Beam with Full U.D.L only. Formula for Deflection and Slope in the Standard cases (studied in Sem. I). Application in Problems.
  - a. Propped Cantilever. Use Deflection to Find Reactions in this case of a Statically Indeterminate Structure.

### **Unit 4. Combined Stresses**

1. Compressive Members Subjected to Eccentric Loading. Stresses developed at four corners.
2. Middle third Rule, Kernel of a Column. Application of Middle Third Rule in Foundations.
3. Application of the theory to Chimneys.

### **Unit 5. Frames and Trusses.-1**

1. Introduction of Trusses as a Building Element and Why Important.
2. Perfect and Imperfect Frames. Redundant Members.
3. Analytical Solutions. – Method of Joints, Method of Sections

### **Unit 6. Frames and Trusses.-2**

1. Graphical Solution of Frames.

## **RECOMMENDED READING**

1. Design of steel structures-Vazirani – Rathwani.
2. Design of steel structures- L.S. Negi.
3. R.C.C. Design – Khurmi, Punmia, Sushilkumar.
4. Elements of Structures – Morgan.
5. Structure in Architecture – Salvadon and Heller.
6. Structure Decisions – F. Rosenthal.
7. Strength of Materials by Amol Dongre



## ARCHITECTURAL DRAWING AND GRAPHICS II

<b>ARCHITECTURAL DRAWING AND GRAPHICS II</b>			
Subject Code		1201513	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2 Studio=5)	7	Sessional (Internal)	50
		Sessional (External)	50
		Viva (Internal)	NIL
		Viva (External)	NIL
		In semester exam	NIL
		End Semester exam	NIL
		Total Marks	100
		Total Credits	4

### COURSE OBJECTIVES:

- To enable the students to understand and express Composite three-Dimensional objects and buildings formed by additive and interpenetrated solids using various graphical projection systems including sections.
- To help the students understand the technique of graphical documentation of a built structure/environment through measured drawing/s.
- To enable the students to express their design ideas through various sketching techniques.

### COURSE OUTLINE:

#### Unit 1 Solid Geometry:

- Understanding and drawing of composite and complex three dimensional objects formed by addition and/or interpenetration of various objects in various planes.
- Surface Development of various three dimensional objects.
- Orthographic projections of true shapes of sectional planes.

#### Unit 2 Measured drawing/ Scale Drawing:

- measured drawing (Plan/s Section/s Elevation/s and isometric/ axonometric view), drawn to appropriate scale, of a simple two storeyed building including a stairway and/or toilet.

#### Unit 3 Sketching:

- Free hand sketching to communicate design/concept sketches, Building construction details etc.

#### Unit 4 Introduction to CAD:

- Introduction to basics of Computer Aided Drawing with basic commands for Drawing, Modifications, Text and Annotations (dimensions) sufficient to construct simple geometrical shapes.

### SESSIONAL WORK:

- Sessional work should be planned to cover all the units mentioned in course outline with thrust on skill development, accuracy and understanding of the topic.
- Twenty five percent weightage in assessment should be given to the assignments of sketching
- Minimum of Eight manually drafted assignments to cover the course outline based on the following modules:





a	Architectural scales and annotations	2 to 3 Assignments
b	Orthographic (plan, section/s, elevation/s) isometric, axonometric projections of three dimensional objects and building components	5 Assignment
c	Scale drawing of building/s of sufficient size to demonstrate basic building components, standard annotations.	1 to 2 Assignments

### RECOMMENDED READINGS

1. Ching Francis D.K.: Architectural Graphics
2. Kelsey W. E.: Geometrical & Building Drawing
3. Leslie Martin: Architectural graphics:
4. B. James: Essential of Drafting
5. H. Joseph and Morris: Practical plane and solid geometry
6. Gill Robert: Rendering with pen and ink
7. Burden Ernest: Architectural Delineation

## HISTORY OF ARCHITECTURE I

HISTORY OF ARCHITECTURE I			
Subject Code		1201514	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2 Studio=1)	3	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

### COURSE OBJECTIVE

- To introduce student to architectural development with reference to time, space and people.

### COURSE OUTLINE

- To introduce students to the historical architecture of various civilisations before 1 century CE. : Ancient Civilisations of Egypt, Mesopotamia, Indian sub-continent, China, and Mediterranean region.
- To sensitise students to the linkages between architecture and the socio- cultural, political, geographical and economic context with respect to the ancient civilisations.
- To familiarise students with noteworthy architectural production from the period under study and their significance.

### SESSIONAL WORK

- At least 3 project based assignments including one tutorial.

### RECOMMENDED READINGS

1. History of Architecture by Sir Bannister Fletcher.
2. History of Architecture by Spiro Kostof.
3. The Story of Western Architecture by Bill Risebero.



4. Indian Architecture (Vol. I & II) by Percy Brown.
5. History of Indian and Eastern Architecture by James Fergusson.
6. Hindu India by Henry Stierlin.
7. Islamic Architecture in India by Satish Grover.
8. The History of Architecture in India by Christopher Tadgell.
9. A History of Fine Arts in India and West by Edith Tomory.

## CLIMATOLOGY

<b>CLIMATOLOGY</b>			
Subject Code		1201515	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2 Studio=1)	3	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In semester exam	NIL
		End Semester exam	NIL
Total Marks		50	
Total Credits		2	

### COURSE OBJECTIVES:

To understand climate as a determinant of architectural design and to enable the students to evolve climate responsive design.

### COURSE OUTLINE

- Introduction to elements of nature, variables of climate (definitions, measurement and significance).
- Global climate, regional variations and microclimate.
- Climatic zones in India and respective traditional climate responsive architecture.
- Concept of heat exchange in buildings. Theory and concept of thermal comfort, comfort indices and its application to architectural design.
- Climate responsive design strategies like site planning, orientation, building form, shading, ventilation, materials and technology.

### SESSIONAL WORK

- One individual design assignment related to design of openings with respect to their size, location, shading and ventilation.
- One individual study assignment each based on climatic responsive building from traditional and contemporary architecture.

### RECOMMENDED READINGS

1. Climatology Fundamentals and application – John R Mather
2. Introduction to Climatology – Anthony Sealey.
3. Climatologically & Solar data for India – T. N. Seshadry.
4. Climatic Design – Watson Donald.
5. Manual of tropical housing and building – Koenigsberger & Ingersol.
6. Tropical Architecture – Maxwell Fry & Jane Drew
7. Design Primer for Hot Climate – Allan Konya
8. Sun, Wind and Light by G. Z. Brown.
9. Energy Efficient Housing by Mili Majumadar, Published by TERI.
10. Climatically Responsible Energy Efficient Architecture by Arvindkrishnan.  
Housing Climate and Comfort by Martin Evans.



## WORKSHOP II

WORKSHOP II			
Subject Code		1201516	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1 Studio=2)	3	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

### COURSE OBJECTIVES:

- Introducing students to various materials and techniques used in making Architectural models.
- Enabling Students to make Architectural models for study and presentation.
- To introduce computer aided 3D modeling.

### COURSE OUTLINE:

- Introduction to materials such as balsa wood, plastics, cork and the techniques to make Architectural Models should preferably be co-ordinated with subjects like 'Design', 'Building Technology and Materials' etc.
- Introducing computer aided 3D Modeling of simple and composite objects.

### SESSIONAL WORK:

- Sufficient number of assignments to cover the topics given below, with thrust on exploring maximum materials and techniques, understanding their appropriateness for the purpose and skill development.

a	Producing 2-dimensional drawing of small scale building using computer aided drafting softwares	2 Assignments
b	3-dimensional model of small scale building/ building construction details etc using softwares	2 Assignments

### RECOMMENDED READING:

- Sandeep Singh, Beginning Google Sketch up
- Aidan Chopra, Sketchup-2014 for Dummies
- Chris Grover, Google Sketch up



# **SAVITRIBAI PHULE PUNE UNIVERSITY**

## **DETAILED SYLLABUS OF SECOND YEAR**

**[B.ARCH.]**

**TO BE IMPLEMENTED FROM 2016-17**

**BOARD OF STUDIES IN ARCHITECTURE  
FACULTY OF ENGINEERING**



## DESIGN III

<b>Design III</b>			
Subject Code		2201517	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3, Studio=8)	11	Sessional (Internal)	100
		Sessional (External)	100
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	250
		Total Credits	7

### COURSE OBJECTIVES:

- To comprehend Design as iterative process at various scales/ levels.
- To comprehend relationship between design, visual arts, building construction, climatology, building materials, structure etc and evolve a design solution.

### COURSE OUTLINE:

- Aesthetical, functional (activity, user, space relation) , technical (construction and material) and environmental (climatic, socio-geographic) aspects of architectural design.
- Various sources for inspiration for architectural design such as nature, history, geometry, culture etc.
- Design projects to focus on multi-functional, multi-cellular built environments such as nursery school, library, canteen, house, primary medical centre, cresse, community hall, health club, hobby centre for children etc.

### SESSIONAL WORK:

Minimum two Architectural design assignments with multi-cellular dual level spaces approximately 300-500 sq.m and communicated effectively through architectural graphics, two and three-dimensional sketches, models and narratives. Additional one eskee of short duration.

### REFERENCE BOOKS

1. Antoniades, C. Anthony: Epic Space: Towards roots of Western Architecture.
2. Robert Sommer. -Design Awareness.
3. C.M. Deasy -Design for Human Affairs.
4. Christopher Alexander- Pattern Language.
5. Anthony Sealey, Introduction to Climatology.
6. Karen A. Frank and R. Bianca Lepori, Architecture from the Inside Out.
7. Heller Robert and Salvadori Mario, Structure in Architecture.

## BUILDING TECHNOLOGY AND MATERIALS III

<b>BUILDING TECHNOLOGY AND MATERIALS III</b>			
Subject Code		2201518(SV) 2201519(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3, Studio=4)	7	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	30
		End Semester exam	70
		Total Marks	200
		Total Credits	5



## **COURSE OBJECTIVES**

- To study various types of deep and shallow foundations used in various types of soils for framed construction
- To introduce students to medium span timber roofs between 6m to 12m.
- To understand basic principles of RCC construction
- To study other components of a building project

## **COURSE CONTENT**

### Unit 1

- Sheet roof coverings
- Different types of flooring and paving materials and finishes and preformed and in-situ techniques for the same.
- Cement Concrete- ingredients, admixtures and additives, manufacturing/ mixing properties, placing, curing, testing.
- Steel for reinforcement of concrete.
- All tools for reinforced cement concrete construction.

### Unit 2

- Different types of foundations, shallow and deep foundations for different types of soils, foundation on sloping site, failure of foundations
- Introduction to the relevance of soil mechanics to foundation design

### Unit 3

- Causes of dampness and necessity of damp- and water- proofing.
- Different methods or treatments of damp- and water proofing.
- Different materials used in damp- proofing including brick on edge, rough Shahabad stone, bitumen sheets, plastic sheets and other proprietary materials.

### Unit 4

- Various types of sliding and folding doors
- Doors in non- timber materials
- Bay window

### Unit 5

- Fencing and Gates- types, materials and techniques

### Unit 6

- Principles of RCC
- Reinforced concrete construction process with mixing of concrete, transportation, form-work, laying of reinforcement, casting, deshuttering and curing.
- RCC frame structure for smaller spans

## **SESSIONAL WORK**

- Hand drawn drawings on Units 2, 4 and 6; Assignments on units 1, 3, and 5.

## **RECOMMENDED READING**

1. 'Elements of Structure' by Morgan
2. 'Structure in Architecture' by Salvadori
3. 'Building Construction' by Mackay W. B., Vol. 1 – 4
4. 'Building Construction' by Barry, Vol. 1 – 5
5. 'Construction Technology' by Chudley, Vol. 1 – 6
6. 'Building construction Illustrated' by Ching Francis D. K.
7. 'Elementary Building Construction' by Michell



8. 'Structure and Fabric' by Everet
9. 'Engineering Materials' by Chaudhary
10. 'Building Construction Materials' by M. V. Naik
11. 'Civil Engineers' Handbook' by Khanna
12. 'Vastu Rachan' by Y. S. Sane
13. National Building Code and I.S.I. Specifications
14. 'Materials and Finishes' by Everet
15. 'A to Z Building Materials in Architecture' by Hornbostle

## THEORY OF STRUCTURES III

THEORY OF STRUCTURES III			
Subject Code		2201520	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	3	Sessional (Internal)	Nil
		Sessional (External)	NIL
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	30
		End Semester exam	70
		Total Marks	100
		Total Credits	2

### COURSE OBJECTIVES

1. To understand the concept of Buckling and Crushing in Columns.
2. To understand Fixity at supports and Concept of Continuity over supports and Negative Bending Moments
3. To understand the principles of Load Bearing Construction, Use of Arches and Lintels.
4. To Study the strength of one Material - Steel and the use of these material as Beams, and Columns or as members of a Truss.
5. Design By **Working Stress Method**

### COURSE CONTENT

#### Unit 1 - Analysis of Columns

1. Euler's and Rankine's Theory for Buckling and Crushing Failure in Columns. Assumptions and Limitations. Concepts of End Conditions, Slenderness Ratio. No Derivations, Simple Problems only.

#### Unit 2 - Analysis of Fixed Beams and Continuous Beams

1. Fixed Beam as a statically in-determinate structure. Concept of Negative Bending Moment at supports. Fixed End Reactions (No derivations). Simple Problems with full u.d.l and one or two point Loads.
2. Continuous Beams. Concept of continuity over supports and Typical B.M.D to explain the negative B.M.D over supports. Enlist methods for computing B.M.D. Theory only. No problems.

#### Unit 3- Loading on Structures, Transfer of loads, Load Bearing Constructions.

1. Loads classified as Live Loads (as per occupancy), Dead Loads (Densities), Wind Loads (Wind Pressure Tables, Reversal of Stresses), Snow Load, and Seismic Loads. Loads Transfer from Slab to Beam to Columns to Footing. Beam Loads to Include Brick wall Loads.



- Principles of Load Bearing Constructions. Load Transfer in Arches – Different Kinds of Hinged Arches. Load Transfer across Lintels. Theory only – No Problems.

#### Unit 4- Methods of Design –Working Stress Method

- Explanation, Assumptions, Factors of Safety, Limitations. And Advantages.

#### Unit 5- Design of Steel structures

- Introduction to I.S.800. (W.S. Method). Different Grades and Properties of Steel.
- Steel Tables- Different Sections Available and their applications. Reading of Steel Tables.
- Design of Steel Girders – Using I sections.
- Design of Steel Stanchions – Using I Sections and C.
- Design of Compression Member and Tension Members of a Roof Truss Using Angle Sections.

#### Unit 6- Connections in Structural Steel

- Riveting, Welding, Bolting. Advantages and Disadvantages.
- Numerical problems on welding and bolting only.

#### RECOMMENDED READING

- Design of steel structures-Vazirani – Rathwani.
- Design of steel structures- L.S. Negi.
- R.C.C. Design – Khurmi, Punmia, Sushilkumar.
- Elements of Structures – Morgan.
- Structure in Architecture – Salvador and Heller.
- Structure Decisions – F. Rosenthal.

## BUILDING SERVICES I

BUILDING SERVICES I			
Subject Code		2201521(SS) 2201522(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2, Studio=2)	4	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	30
		End Semester exam	70
		Total Marks	150
		Total Credits	3

#### COURSE OBJECTIVES:

To introduce students to following Building Services in low, medium and high rise buildings and inculcate in them the integration of services in architectural design. This term aims at following two services.

- Commonly used systems for Sewage, Sullage & and Garbage disposal
- Systems for hot and cold water supply in a building premises.

#### COURSE OUTLINE:

To introduce students to drainage systems i.e. collection, conveyance & disposal of sewage, sullage and Effluents from a building premises , including methods and equipments involved.

Introduction to storage , sourcing and distribution of hot and cold water in a building premises including the study of all components involved





Acquainting students to indoor lighting systems, natural and artificial. Introduction to electrical Installation in a building, from the supply company. Mains to individual outlet points, including all components and systems involved.

### **UNIT I Water supply - I**

- 1.1 Tapping of water mains on street by means of ferrule
- 1.2 Storage and distribution of water in the premises
  - Sump / Suction tank, overhead water storage tank / pressure tanks, community over head water storage tanks.
  - Lifting of water from the sump / suction tank to the overhead water storage tank with the use of Pumps.
- 1.3 Pipes and piping network
  - Pipes made of materials commonly used that is Galvanized Iron , P.V.C., Copper etc.
  - Classification of pipes, specials used in the network , joinery. Installation of the network – open and concealed.
- 1.4 Various control valves

### **UNIT II Water supply - II**

- 2.1 Taps, faucets and other fittings
  - Bib taps (ordinary, Screw down , half turn , quarter turn using ceramic disks ) variations such as pillar taps , angle valves , shower roses etc.
  - Mixing units for wash-hand basins, kitchen sinks, shower units, baths etc. (Both of valve and diverter type and single lever type)
- 2.2 Flushing cisterns and flush valves.

### **UNIT III Hot Water Supply.**

- 2.1 Systems of hot water supply using conventional and non conventional energy sources.
  - Direct systems, In-direct systems , components and equipments used for the same.
- 2.2 Circulation systems i.e. ring system, up feed systems , drop system etc.]
- 2.3 Insulation of piping and safety devices.

### **UNIT IV Drainage-I**

- 4.1 Sanitary fittings – Water Closets (Indian and European) Wash down, double syphonic , floor mounted , wall hung etc.
  - Bidets
  - Wash hand Basins, Bath- Tubs.
  - Kitchen and laboratory sinks.
  - Urinals.
- 4.2 Traps: their uses and functioning.
  - 'p' , 's' , and 'q' traps for Water Closets.
  - Bottle traps, floor traps, gully traps, grease traps and disconnecting traps.
- 4.3 Pipes and piping network.
  - Single and double stack systems.
  - Materials of pipes – Cast iron , P.V.C. , A.C. Stoneware , R.C.C. etc. and their methods of jointing.
  - Specials- Jointing and installations.
  - Anti- Siphonage Pipes.

### **UNIT V Drainage-II**

#### Underground Drainage

- Locations and use of appurtenances i.e. inspection chambers , manholes, disconnecting chambers, ventilating shafts , light shafts etc.
- Storm water drainage systems- Separate, combined, partially separate.
- Ventilation of building drainage system.
- Self cleansing velocity- Thumb rules for diameters and gradients of pipes in relation to self cleansing velocity.
- Laying of underground drainage systems.
- Testing of building drainage systems.
- 

### **UNIT VI Sewage Treatment**

#### Disposal within the Premises.

- Septic tanks, its function and design.



- Bio gas plants and their functioning.
- Effluent treatment tanks.
- Introduction to sewage treatment plants

### SESSIONAL WORK

- Preparing drainage and water supply layouts of a building site with more than one building on the site based upon the theory learnt and supported with necessary calculations (70% weightage).
- Visits to construction sites and preparing site visit reports, market survey and finding out latest trends and new materials (30% weightage).

### RECOMMENDED READING

1. Plumbing-Johnson A.
2. Sanitation, Drainage and Water Supply-Mitchell.
3. Environment and Services-Peter Burberry.

## HISTORY OF ARCHITECTURE II

HISTORY OF ARCHITECTURE II			
Subject Code		2201523	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2, Studio=1)	3	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

### COURSE OBJECTIVE

- To introduce student to architectural development with reference to time, space and people.

### COURSE OUTLINE

- To introduce students to the evolution of architecture of Europe and its immediate surroundings from 1<sup>st</sup> century CE to 18<sup>th</sup> century CE.
  - Religious architecture under Christianity
  - Broad periods of European cultural history including Gothic, Renaissance, Baroque and Revival
- To sensitize students to the linkages between architecture and the socio- cultural, political and economic context of the period.
- To introduce students to the developments in technology and the subsequent effect on architecture.
- To familiarise students with noteworthy architectural productions from the period and their significance.
- To introduce students to the regional and temporal variations in archetypes and the rationale for the same.

### SESSIONAL WORK

Two project based assignments and one tutorial AND.

Measure drawing and documentation of architectural components/ small building dating from the Colonial period in India.

### RECOMMENDED READING

1. History of Architecture by Sir Bannister Fletcher.



2. History of Architecture by Spiro Kostof.
3. The Story of Western Architecture by Bill Risebero.
4. Indian Architecture (Vol. I & II) by Percy Brown.
5. History of Indian and Eastern Architecture by James Fergusson.
6. Hindu India by Henry Stierlin.
7. Islamic Architecture in India by Satish Grover.
8. The History of Architecture in India by Christopher Tadgell.
9. A History of Fine Arts in India and West by Edith Tomory.

## ARCHITECTURAL DRAWING AND GRAPHICS III

ARCHITECTURAL DRAWING AND GRAPHICS III			
Subject Code		2201524	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2, Studio=3)	5	Sessional (Internal)	50
		Sessional (External)	50
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	100
		Total Credits	3

### COURSE OBJECTIVES:

- To enable the students to communicate an architectural idea / proposal in a legible and effective manner through perspective projections, use of shades and shadows, and various architectural presentation and rendering techniques.
- To enable the students to generate simple architectural drawing using **CAD**

### COURSE OUTLINE:

#### Unit 1 Perspective Drawing:

- Drawing one-point and two-point perspective of objects and buildings/ building components using various methods including grid method.
- Introduction to concept of bird's eye view, worm's eye view etc

**Unit 2 Sciography:** Principles of Sciography (shades and shadows) for 3-Dimensional objects and buildings on plans, elevation, isometric and perspective.

**Unit 3 Presentation Techniques:** Introduction to various mediums for architectural presentations in various drawing formats.

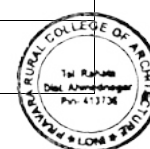
**Unit 4 Sketching:** Introduction to Sketching techniques using various mediums to capture spatial character (built or inbuilt)

**Unit 5 Computer Aided Drawing:** Advance commands in CAD such as Setting Drawing parameters, Layer controls, Hatching, Model and paper space settings etc  
Draughting single building from Semester II Design on CAD

### SESSIONAL WORK:

- Sessional work should be planned to cover all the units mentioned in course outline with thrust on skill development, accuracy and understanding of the topics.
- Minimum of Eight manually drafted and at least one CAD assignment to cover the course outline and based on the following modules:

a	One-point and two-point perspective (objects and buildings)	3 to 4 Assignments
b	Sciography of objects and buildings/ building components	3 to 4 Assignments
c	Demonstration of Presentation techniques in various drawing formats (Preferably with 'own Design Drawings')	2 to 3 Assignments
d	CAD drawings (Plan, Section/s Elevation/s) with layers and hatch.	1 Assignment



**RECOMMENDED READING:**

- Holmes John M. : Applied Perspective
- Themes and Hudson: Perspective for Architects
- Friedrich W. Capelle: Professional perspective drawing for Architects and Engineers
- Sha Publishing Co. Ltd.:Interior perspective in Architectural Design- Japan Graphics
- Japan Publishing Co: Modern Architectural Rendering best 180
- Japan Publishing Co: Perspective Drawings of Modern Architecture
- Japan Publishing Co: Air brushing in rendering
- Shankar Mulik: Perspective and Sciography

**SURVEYING AND LEVELLING**

SURVEYING AND LEVELLING			
Subject Code		2201525	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	3	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

**COURSE OBJECTIVES**

- To enable the students to get conversant with locating the object positions in horizontal and vertical plane with desired accuracy as needed for architectural profession.
- To prepare and interpret survey drawings.
- Every effort will be made to relate the practical and field work and make it appropriate for the profession of Architecture and execution of building projects. Students should be exposed to latest modern gadgets available for precise work in the field and also use of computer software in this subject.

**DETAILED SYLLABUS**

Unit I

- Linear Measurements. Measurements in horizontal plane, survey stations, survey lines open and closed traverse, locating objects by chaining and offsetting, direct and indirect ranging, locating field boundaries and working out area of field, measuring distances with chain, tapes, ODM's ,EDM's, introduction to Total Station, survey accessories, measurements along sloping ground.

Unit II

- Chain Surveying: Base line, tie lines, check lines.

Unit III

- Directional and Angular Measurements. Magnetic and true meridian, Magnetic and true bearings, use of bearings, use of prismatic compass, calculation of included angles, Fore and back Bearings, declination plotting and adjustment of closed traverse

Unit IV

- Levelling: Dumpy level, auto and tilting level, principle lines of leveling instrument, axis of telescope, axis of bubble tube, line of collimation, vertical axis recording by collimation plane, method and rise-fall method, B.S/J.S/F.S, change point, level surface, horizontal surface, datum, Reduced Level/ elevation of a point, Bench Marks, GTS,PBM/ABM/TBM. Temporary A djustments.

Unit IV:

- Contours: Characteristics, contour interval, direct and indirect methods of contouring, block contour surveys, profile leveling, longitudinal and cross sections, plotting the contours and profiles,gradient.

Unit V:

- Uses of Transit Theodolite. Measuring horizontal and vertical angles, calculation height of buildings, use of Theodolite as technometer, techeometric tables, interpolation of contours.



Unit VI:

- Plane Table Surveys; Accessories used in plane tabling, methods of locating objects, methods of table orientation, Advantages and disadvantages.

Unit VII:

- Use of Planimeter: Area of zero circle, calculating area of irregular shape figures.

**SESSIONAL WORK**

Based on field measurements sheet entered in field book :

- 1) Calculation of area of field(Chain and cross staff survey)
- 2) Compass Survey.
- 3) Plane Table Survey.
- 4) Block Contour Survey.
- 5) Profile Levelling.

**DESIGN IV**

<b>Design IV</b>			
Subject Code		2201526	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3, Studio=8)	11	Sessional (Internal)	100
		Sessional (External)	100
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	250
		Total Credits	7

**COURSE OBJECTIVES:**

- To comprehend site specific stimuli through responses to physical, climate, visual, cultural contexts through indigenous construction, technology, building materials, structure etc.

**COURSE OUTLINE:**

1. Multiple layering of architectural space (without aid of mechanical means of vertical transport), its relationship with structure, technology and resultant built form; Concept of earthquake resilient structural systems for indigenous applications.
2. Attributes of Architectural character through application of indigenous materials, construction methods.
3. Function and space studies; defined user group specific perception of space; Concept of minimum and maximum limits of development wrt to foot print, building heights.
4. Concept of Passive solar responses; fenestration design.
5. Site analysis wrt to surroundings; zoning and activity distribution; Circulation and activity relationships through adjacencies, achieving performance integrity through functional adjacencies and elementary services of water and drainage.
6. Study and analysis of multicellular, multiple level (without aid of mechanical means of vertical transport), spaces by application of principles of functionality, climate, composition, and aesthetics.
7. Study of a Settlement of a semi urban type/ community in an urban location and the analysis and documentation w.r.t. lifestyle of occupants, climatic and topographical response, semipublic built and open spaces, and associated architectural character.

**SESSIONAL WORK:**

- Graphic documentation and analysis of the settlement study and along with a short written report with one design assignment related to the settlement studied.
- Minimum one architectural design project (other than the one mentioned above) with multicellular multi-level spaces such as primary school, hostel, sports facility, resorts, medical facility etc. approximately 1000-1200 sq.m. and effectively communicated through architectural graphics, two and three-dimensional sketches, models and narratives.



## REFERENCE BOOKS

1. Jan Bilwa and Leslie Fairweather, editors, A.J. Metric Handbook.
2. DernstNeufert's Architect's data.
3. Walter Gropius, Total Architecture.
4. Giedion, Siegfried; Space, Time and Architecture.
5. Gibbered, Fredrick: Town Design.
6. David Gosling, Gordon Cullen – Visions of Urban Design.
7. David Robso, Geoffrey Bawa – the complete works.
8. Casa Scheer Brenda, The Evolution of Urban Form.

## BUILDING TECHNOLOGY AND MATERIALS IV

BUILDING TECHNOLOGY AND MATERIALS IV			
Subject Code		2201527(SV) 2201528(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3, Studio=4)	7	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	30
		End Semester exam	70
Total Marks		200	
Total Credits		5	

## COURSE OBJECTIVES

- To introduce students further to RCC frame construction and a basic understanding of ferrocement construction.
- To introduce students to different building materials related to RCC construction

## COURSE CONTENT

### Unit 1

- Ready mix concrete, light weight concrete

### Unit 2

- RCC floor slabs: one-way, two way slabs, cantilever slabs, column- beam- slab junctions, toilet slabs, balcony slabs, canopies.
- Construction of various types of pre-cast and in-situ RCC stairs
- Introduction to ferrocement as a material and technique of construction.

### Unit 3

- Types of elevators and escalators- installation process and detail.
- Construction of lift shafts and machine rooms.

### Unit 4

- Windows in non- timber materials
- Water- proofing materials used in basement construction

## SESSIONAL WORK

- Hand drawn drawings on Units 2, 3 and 4; Assignments on unit 1.

## RECOMMENDED READING

16. 'Elements of Structure' by Morgan
17. 'Structure in Architecture' by Salvadori
18. 'Building Construction' by Mackay W. B., Vol. 1 – 4
19. 'Building Construction' by Barry, Vol. 1 – 5
20. 'Construction Technology' by Chudley, Vol. 1 – 6
21. 'Building construction Illustrated' by Ching Francis D. K.
22. 'Elementary Building Construction' by Michell
23. 'Structure and Fabric' by Everet



24. 'Engineering Materials' by Chaudhary
25. 'Building Construction Materials' by M. V. Naik
26. 'Civil Engineers' Handbook' by Khanna
27. 'Vastu Rachan' by Y. S. Sane
28. National Building Code and I.S.I. Specifications
29. 'Materials and Finishes' by Everet
30. 'A to Z Building Materials in Architecture' by Hornbostle

## THEORY OF STRUCTURES IV

THEORY OF STRUCTURES IV			
Subject Code		2201529	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	3	Sessional (Internal)	Nil
		Sessional (External)	NIL
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	30
		End Semester exam	70
		Total Marks	100
		Total Credits	2

### COURSE OBJECTIVES

1. To Study Wood as a Material.
2. To Study Limit State Method.
3. To Study Reinforced Cement Concrete as a Material.
4. To Design Simple Compressive and Flexural Members in R.C.C.

### COURSE CONTENT

#### Unit 1.Wood by W.S Method

1. Introduction to I.S.883. Study of Wood as a Material. Different Grades Available
2. Design of a Wooden Flexural Member either as a Simple Supported Beam or a Cantilever with Simple Loading. Depths Limited to 300 mm. Design by Working Stress.
3. Introduction to Modification Factors and Form Factors in Design of Wood.

#### Unit 2 - Concrete Technology

1. Concrete Technology. I.S.456 – Different Grades of Concrete. Different Grades of Cement and Steel Used. Study of Cement, Sand, Aggregate and Water. Process of Concreting, Curing, Form Work and Stripping, Water Cement Ratio, and various other details, tests in brief.
2. Basic R.C.C section and terms like Effective depth, covers, Overall Depth. Covers for different R.C.C members.

#### Unit 3.Limit State Design

1. Concept, Various Limit States, Partial Factors of Safety. Characteristic Stresses and Loads
2. Assumptions, Limitations, Advantages and Disadvantages.
3. Stress Block Diagram for Flexural Members and Derivation of Formulae.
4. Combination of M20 Grade concrete and Fe 500 Steel.
5. Balanced, Under Reinforced, Over Reinforced Sections.



## Unit 4.Design of Various R.C.C Members as per I.S.456

1. Span to Depth Ratios for various flexural members.
2. Concept of one way and two way slab. Importance of distribution steel in one way slab.
3. Design of One Way Slab for different live loads and floor finishes.
4. Design of Two Way Slab using Rankine Gashroff Method of load distribution/constants
5. Design of Singly Reinforced Beam with Shear Reinforcement.
6. Design of Chajja, and Cantilever Slabs.
7. Design of Short R.C.C Columns. Reduction factor for long R.C.C columns. I.S. Provisions. All Answers to include Schedules, and Typical Reinforcement Details.
8. Bond, Lap in Reinforcement, Development Length and Placing of Reinforcement. Theory only.

### RECOMMENDED READING

1. Design of Steel Structures: Vazirani-Rathwani.
2. Design of Steel Structures-Negi.
3. R.C.C.Design –Khurmi, Punmia, Sushilkumar.
4. Elements of Structure –Morgan.
5. Structure in Architecture-Salvadori and Heller.
6. Structural Decisions-F.Rosenthal.

## BUILDING SERVICES II

BUILDING SERVICES II			
Subject Code		2201530(SS) 2201531(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2, Studio=2)	4	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	30
		End Semester exam	70
		Total Marks	150
		Total Credits	3

### COURSE OBJECTIVES

To introduce students to following Building Services in low, medium and high rise buildings and inculcate in them the integration of services in architectural design. This term aims at following two services.

- Lighting and electrification.
- Introduction to rainwater harvesting and alternative energy sources.

### COURSE OUTLINE

#### UNIT I Waste Disposal.

- Collection and disposal of organic and in-organic waste
- Sacks, bins, grinders , incinerators , compactors and refuse chutes.
- Vermiculture and composting.

#### UNIT II Lighting:

- Indoor lighting- natural and artificial
  - Systems of lighting such as direct, indirect, diffused.
  - Applications of lighting systems with special reference to levels of illumination for various uses and lumen method calculations.
  - Light fittings.





### UNIT III Electrification.

- Introduction to general distribution of electric power in urban areas, substations for small schemes in industrial units.
- Electrical installations in a building from the supply company mains to individual outlet points including meter board, distribution board, layout of points with load calculations.
- Electrical wiring systems for small and large installations including different materials involved
- Electrical control and safety devices – switches, fuse, circuit breakers earthing, lightning conductors etc.

### SESSIONAL WORK

- Preparing electrical layout and lighting plan of a building interior supported with necessary calculations (70% weightage).
- Visits to construction sites and preparing site visit reports, market survey and finding out latest trends and new materials (30% weightage).

### RECOMMENDED READING

- Daylight in Architecture-Benjamin Evans.
- Lighting in Buildings-Hapkinsen H.D.Kajr.
- Lighting in Architectural Design.-Derek Philips.
- BBC83 P[art VII, Section I, Lighting and Ventilation.

## HISTORY OF ARCHITECTURE III

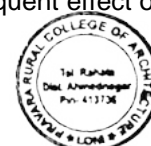
HISTORY OF ARCHITECTURE III			
Subject Code		2201532	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2, Studio=1)	3	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

### COURSE OBJECTIVE

- To introduce student to architectural development with reference to time, space and people.

### COURSE OUTLINE

- To introduce students to the evolution of architecture of the Indian sub-continent from 1<sup>st</sup> century CE to 18<sup>th</sup> century CE.
  - Architecture of the Buddhists, Hindus and Jains and its evolution with reference to regional and stylistic variations.
  - Architecture under Islam.
  - Evolution of form, technique and ornamentation, and regional and stylistic variations in Indian architecture
  - Architecture of Maharashtra in the 18<sup>th</sup> and 19<sup>th</sup> centuries.
- To sensitize students to the linkages between architecture and the socio- cultural, political and economic context of the period.
- To introduce students to the developments in technology and the subsequent effect on architecture.



- To familiarize students with noteworthy architectural productions from this period and their significance.
- To introduce students to the regional and temporal variations in archetypes and the rationale for the same.
- To study in detail extant examples from this period available in the region of the college.

### SESSIONAL WORK

- At least 2 project based assignments and one tutorial AND
- Detailed measured drawing and documentation of one building/ complex dating from the above mentioned period.

## TECHNICAL COMMUNICATION

TECHNICAL COMMUNICATION			
Subject Code		2201533	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	3	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

### COURSE OBJECTIVES

- To equip the students to communicate effectively using various modes of communication such as graphical, textual, oral and help them to develop various soft skills.

### COURSE CONTENT

- Writing skills : Formal letter writing, job applications, preparing a resume, reporting an event, précis writing, comprehension in English.
- Oral skills : Group discussions, giving a speech, appearing for an interview.
- Presentation skills : Presenting using power point presentation, graphical modes (sketching, 3D views).
- Body language, appearance, gestures, voice modulation, speech organization etc.
- Using various computer applications such as word processing, MS excel, photoshop etc.

### SESSIONAL WORK

- Minimum 10 assignments to cover all the aspects of the course content mentioned above.

## WORKING DRAWING I

WORKING DRAWING I			
Subject Code		2201534	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2, Studio=3)	5	Sessional (Internal)	50
		Sessional (External)	50
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	100
		Total Credits	3



## **COURSE OBJECTIVES**

- To enable the students to prepare working drawings of an architectural project and imbibe the significance of working drawings from the point of view of execution of the work on site and as important component of tender documents.

## **COURSE CONTENT**

- Introduction to the concept of working drawings and their importance.
- Graphical presentation of all the components of a building along with dimensioning and annotations.
- Understand and apply IS Codes and internationally accepted norms / conventions / methods of preparing a working drawing along with tabulation of schedules of materials, finishes and hardware.

## **SESSIONAL WORK**

- One working drawing of an architectural design project having load bearing structure with minimum 100 sq. m. carpet area. (4 to 5 drawings).
- At least two details such as doors / windows / railings / kitchen otah etc. (1 drawing)



DRAFT SYLLABUS FOR APPROVAL OF FACULTY  
**Third year 2015 Pattern**

**Semester V**



<b>Design V</b>			
Subject Code		3201535	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week= 11 (lectures=3, Studio=8)	Sessional (Internal)	100	
	Sessional (External)	100	
	Viva (Internal)	25	
	Viva (External)	25	
	In-semester exam	nil	
	End Semester exam	nil	
Total Marks		250	
Total Credits		7	

#### COURSE OBJECTIVES:

- Design of Campus comprising of more than one building and evolving design in response to the site, its characteristics and the context.
- Designing of buildings with different functions, requiring spaces of different scales and employing suitable structural systems.

#### COURSE OUTLINE:

- Designing in a different socio geographic context [other than where the institute is located].
- Undertake programming research to understand the socio-cultural patterns, geographic context and address the needs of the users and the site and evolve a sustainable design.
- Creation and design of open spaces within the campus.
- Study, analysis and synthesis of various design parameters in built-unbuilt spatial relationship.
- Conceptualizing services such as storm water management, locations of water tanks, sewage disposal system, etc.
- Introduction to functions requiring column free spaces and employing suitable structural systems.
- Modular planning, grid planning and coordination of various grids in plan and three dimensions.
- Time bound decision making and preparing sketch design.

#### SESSIONAL WORK:

- A major design project of duration 10-12 weeks of campus planning. Example : Residential school, Club, Institutional buildings, Home for the elderly, Community centre, Resort etc.
- A minor design project of duration 4-6 weeks which could be stand alone building on a site with a focus on two to three activities housed in one building with area not less than 1500 sq.m. Example : Diagnostic centre, Dining hall, Convenience shopping etc.
- One time bound project of duration around 12 hours. The typology and scale of the project can be decided by the college.

**Important Note :** At least one of the two projects [major or minor] mentioned above has to be in a different socio geographic context. The design has to be communicated through architectural graphics, two and three-dimensional sketches, models and narratives. All the design projects must have different sites.



## REFERENCE BOOKS

It is strongly recommended that students refer books focusing on various building types, journals, magazines to widen their knowledge of design and the readings not to be limited to the list of books given below.

Correa, C. (2010). *A Place in Shade*. Delhi: Penguin Books.

Kanvinde, A., & Miller, H. (1969). *Campus Design in India*. Topeka: ostens/American Yearbook Co. .

Lynch, K. (1962). *Site Planning*. MIT Press.

Pandya, Y., & Foundation, V. S. (2007). *Elements of Space Making*. Ahmedabad: Mapin Publishing Pvt Ltd.

White, S. (1995). *Building in the Garden: Architecture of Joseph Allen Stein in India and California*. Delhi: Oxford India Paperbacks.

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<b>Building Technology and Materials-V</b>			
Subject Code		3201537(SV), 3201536(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3, Studio=4)	7	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	30
		End Semester exam	70
		Total Marks	200
		Total Credits	5

### COURSE OBJECTIVES:

- To understand the variations in frame structure with options of different types of slab like flat slab, ribbed and waffle slabs etc. along with pre-stressed RCC technology.
- To understand various structural system to be employed for long span structures.
- To introduce materials and technology of assembling interior elements like partitions, suspended ceiling, furniture units etc.

### COURSE OUTLINE:

**Unit-1:** Characteristics, Properties and types of following materials and their application in interior elements.

- a) Wood, wood derivatives and other panel materials used for interior application.
- b) Finishing materials like laminates, veneers, plastics and metal sheets.
- c) Paints and varnishes.
- d) Hardware required for application to interior and furniture elements.



**Unit-2:** Various types of Reinforced Cement Concrete Flooring Systems for medium spans.

- a) Flat plate, Flat slab, Ribbed slab, Waffle slab, Band beam and slab.
- b) Pre-stressed slabs.

**Unit-3:** Partitions and Paneling

- a) Demountable Partition construction using proprietary and non-proprietary systems using all available materials.
- b) Proprietary and non-proprietary systems of paneling in timber, timber derivative materials plastic, metal and other materials.

**Unit 4:** Suspended Ceiling.

- a) Suspended Ceiling construction using proprietary and non-proprietary systems using all available materials.

**Unit 5:** Furniture Design and assembly using timber and other material along with finishing and upholstery.

**Unit 6:** Construction systems used for long span construction.

- a) Section/bulk active systems (beam structure, frame structure, slab structure)
- b) Vector active systems ( portal frames, 2-D and 3-D trusses etc.)
- c) Surface active systems (Shell structures, folded plate structures etc)
- d) Form active systems (Tensile structures, Pneumatic structures, Arch structures etc.)

**DRAFT SYLLABUS FOR APPROVAL OF FACULTY**

**SESSIONAL WORK:**

- Unit-1:** Compilation of market surveys in form of relevant hand drawn sketches, notes and tabulated information regarding; available types, commercial sizes, properties, unit of measurement, rates etc.
- Unit-2:** Sketches and notes in the journal.
- Unit-3:** Manually drafted scaled drawings of Partitions and Paneling using proprietary and non-proprietary systems of construction using various materials.
- Unit4:** Manually drafted scaled drawings of Suspended Ceiling using proprietary and non-proprietary systems of construction using various materials.
- Unit5:** Manually drafted scaled drawings of furniture units like Bed, Dining Table, etc. using various materials.
- Unit6:** Sketches and notes in the journal.

**REFERENCE BOOKS**

1. Ching Francis D.K. Building Construction illustrated. John Wiley & sons. 2014
2. National Building Code-2005 & ISI specifications for Materials and Methodology of Various Construction.
3. Technical Manuals of various manufacturing companies for proprietary systems of partitions, paneling and suspended ceilings.
4. Alan Everett, Yvonne Dean. Mitchell building series, Building materials and finishes. Routledge 2014
5. Mackay J.K. Building Construction vol.-1-4. Longman Scientific & Technical, 1988.
6. Barry. 'Building Construction' Vol. 1 – 5
7. Cudley. 'Construction Technology' Vol. 1 – 6



THEORY OF STRUCTURE V			
Subject Code		3201538(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	3	Sessional (Internal)	nil
		Sessional (External)	nil
		Viva (Internal)	nil
		Viva (External)	nil
		In-semester exam	30
		Semester exam.	70
		Total Marks	100
		Total Credits	2

**COURSE OBJECTIVES:**

1. To design complex RCC structural elements.
2. Different types of staircases.
3. Types of beams like doubly reinforced, 'T' and 'L'
4. Design of continuous equal span slab by I.S.456 factors.
5. Different structural elements like pre-stressed construction and flat slabs.
6. Columns in multistoried buildings.
7. Types of foundations and design of isolated column footing.
8. Need of retaining wall and design of gravity type retaining wall.

# DRAFT SYLLABUS FOR APPROVAL OF FACULTY

**COURSE OUTLINE:**

**Unit 1: –Staircase Support Systems**

**Numerical** on Design of Dog Legged Staircase with Beams at Various Positions:

**Theory only** on Support Systems and Reinforcement Detailing in the following Cases

- a. Stringer Beams - End Stringer Beams with S.S Slabs Treads.
- b. Stringer Beams - Central Stringer Beams with cantilever Slab Treads.
- c. Folded Plate Staircases.
- d. Open Well Staircases.
- e. Spiral staircase
- f. Dog-legged Staircase with Various Beam Positions.

**Unit 2: Design of Beams**

- I. **Doubly Reinforced Beam** –Concept, Detailing, Need, Locations. **Numerical** on Design of Doubly Reinforced Beams
- II. **T Beams, L Beams / One Way Continuous Slabs:** Divisions of Larger Spaces into smaller one way or two way Slab Units by Using Intermediate Beams. T Beams and L Beams. I.S. Provisions for same.
  1. **Numerical** on Design of T Beams and L Beams - N.A position within flange.
  2. **Numerical** on Design of One Way Continuous Slabs - 3 equal spans using I.S.456 Coefficients
  3. **Theory only** on Design of Coffered Slab.





### Unit 3: Column Design across Multiple Floors:

Design of Columns across Vertical Floors: Vertical Load Calculation, Change of Size, Change of Grades (not for problems), Change of Percentage of Steel.

1. **Numerical** on design of columns with change in size and percentage of steel.
2. **I. S. provisions for eccentrically loaded columns.**

### Unit 4: Pre-stressed constructions and Flat Slabs:

1. **Pre-stressed Concrete:**
  1. Concept and Process of **Pre-tensioning and Post-Tensioning.**
  2. Advantages and Disadvantages over Conventional R.C.C Construction.
  3. Use of High Strength Concrete and Steel in Pre-Stressed Elements
  4. Methods of Pre-stressing - Freyssinet System
  5. **Numerical** on Extreme Fiber Stresses at Mid Span and End Span.
2. **Flat Slab Construction:** Concept of Large Beam less Spaces, Column Capitals, Header Beams  
I.S.456 Provisions for Various R.C.C Elements

### Unit 5: Foundations:

1. Shallow and Deep Foundations
2. Isolated Footings to Combined Footings to Strip Footings to Raft Foundations
3. **Foundations in Soil of low S.B.C** , Piles ,Group of Piles and Pile Caps, Reinforcement Detailing involved
4. **Numerical** on Design of **Isolated Footing** for Square and Rectangular Column, Pad Footing with One Way and Two Way Shear.
5. **Numerical** on Design of **Combined Footing** - Finding Dimensions in Plan only
6. **Theory only on** Design of Combined Footing - B.M.D and Reinforcement Detailing

### Unit 6: Retaining Walls:

1. Need for **Retaining Wall**, Angle of Repose, Rankine's Theory for Active and Passive Earth Pressures. Types of Retaining Walls.
2. **Gravity Retaining Walls** - Height, Proportioning –**Numerical** on Stability Study for O.T.M, Sliding, Maximum and Minimum Pressure at Base

### REFERENCE BOOKS

1. R.C.C. design – Khurmi, Punmia, Sushilkumar.
2. Design of steel structures- L. S. Negi., Vajrani-Ratwani.
3. Structure in Architecture – Salvadori and Heller.
4. Structural Decisions.- F. Rosenthal
5. I.S. 456, I.S. 800, I.S. 875, I.S. 1893, I.S. 13920



<b>LANDSCAPE ARCHITECTURE I</b>			
Subject Code		3201539(SS)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=3)	04	Sessional (Internal)	25
		Sessional (External) Viva (Internal)	25 nil nil
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	50
		Total Credits	2

### COURSE OBJECTIVES:

- To introduce the students to Landscape Architecture and its scope.
- To understand the elements and principles of landscape design and role of landscape elements in design of outdoor environments on the site.
- To introduce the students to various traditions in designed and vernacular landscapes.
- To develop understanding of site analysis and site planning and integrated design of open and built spaces.
- Creating awareness about using Landscape design as a tool to address environmental concerns in Architecture.

## COURSE OUTLINE: DRAFT SYLLABUS FOR APPROVAL OF FACULTY

- Unit 1.** Introduction to Landscape Architecture and its scope ,elements( natural and manmade)and their application in achieving functional, aesthetic, environmental and cultural goals.
- Unit 2.** Introduction to Landscape history/traditions (Eastern, western, central) with emphasis on Indian Landscape traditions.
- Unit 3.** Study of Hardscape (civil work) details with respect to materials and construction techniques. This study should be conducted through visits to designed landscapes.
- Unit 4.** Study of Softscape (plant material), their characteristics and contribution in terms of creating and imparting character to outdoor spaces. This study should be conducted through site/ nursery visit with emphasis on native and naturalized species.
- Unit 5** Introduction to environmental concerns and sustainable site planning (rain water harvesting, solid waste management, passive climate control, etc)
- Unit 6.** Site analysis including understanding natural and manmade aspects (such as microclimate, topography, hydrology, vegetation), physical and socio-cultural context of the site. Introduction to basics of Site planning.
- Unit 7.** Relevance of Art in landscape design (Land art, art in public spaces, etc) for. Eg. works of Andy Goldsworthy, Richard Shilling, Walter Mason, Jim Denevan, Robert Smithson, Andrew Rogers,Dani Caravan, Simon Beck, Anish Kapoor, Neckchand, Subodh Kerkar.
- Unit 8.** Landscape design Project I- A small scale, theme based Landscape design project culminating into an idea/ concept generation/ 3D visualization that encourages creative thinking.

### SESSIONAL WORK:

- Assignments that shall individually or comprehensively cover unit 1 – unit 5. Duration 10-12 weeks.



- Landscape design project with drawings, views, model (optional) holistically representing the concept and the design process .4- 6 weeks.

**NOTE:** It is expected that application of Unit 6 will be demonstrated in landscape design projects.

**REFERENCE BOOKS**

1. Mcharg, I, *Design with Nature*. John Wiley and co. 1978.
2. Jellicoe, G and Jellicoe, S, *The Lasndscpae of Man*, London: Thames and Hudson, 1991.
3. Simonds, J .O, *Landscape Architecture: The Shaping of Man's Natural Environment*, N Y: McGraw Hill Book Co.Inc. 1961.
4. Lynch, K, *Site Planning*, Cambridge: The MIT Press, 1962.
5. Shaheer, M, Wahi Dua, G and Pal A (editors), *Landscape Architecture In India, A Reader: LA, Journal of Landscape Architecture*, 2013.
6. Lyall, S, *Designing The New Landscape*: UK:Thames and Hudson, 1998.
7. Dee, C, *Form And Fabric In Landscape Architecture: A Visual Introduction*, UK: Spon Press, 2001.
8. Eckbo, G, *Urban Landscape Design*, N Y: McGraw hill co. 1961.
9. Laurie, M, *An Introduction to Landscape Architecture*, N Y: American Elsevier Pub. Co. Inc. 1975
10. Rutledge, A J. *A Visual Approach to Park Design*. New York: John Wiley and Sons, 1985.
11. Randhawa, M S, *Flowering Trees*, New Delhi: National Book Trust, 1998.
12. Bose, T K and Choudhary, K, *Tropical Garden Plants in Colour*, Horticulture and Allied Publishers, 1991.
13. Krishen, P. *Trees of Delhi: A Field Guide*, Penguin India, 2006.
14. Mukherjee, P, *Trees of India (WWF Natures Guide)*, Oxford, 2008.
15. Sahni, K C, *The Book of Indian Trees (Bombay Natural History Society)*, Oxford, 1998.
16. Krishna, N and Amrithalingam, M, *Sacred Plants of India*, Penguin Books Limited, 2014
17. Motloch, J. L, *Introduction to Landscape Design*, US: John Wiley and Sons, 2001.
18. Dines, N and Harris, C, *Timesavers Standards for Landscape Architecture*, McGraw Hill Education, 1998.
19. Reid, G, L, *Landscape Graphics*, Watson-Guptill, 2002.
20. Botkin, D. B and Keller, E. A, *Environmental Science: Earth As a Living Planet*, N Y: John Wiley And Co. 1995.
21. Grosholz, E, *The Poetics of Landscape Architecture*, University of Pennsylvania Press, 2010.

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<b>BUILDING SERVICES III</b>			
Subject Code		3201540 (SS) 3201541 (PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (Lectures = 2 Studio = 2)	4	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	nil
		Viva (External)	nil
		In-Semester exam	30
		End-Semester exam	70
		Total Marks	150
		Total Credits	3

**COURSE OBJECTIVES:**

- To comprehend building services as an inclusive part of architectural design process
- To obtain knowledge of technical and design aspects of natural ventilation and HVAC



## **COURSE OUTLINE:**

- Technical and environmental aspects as principles of working, components, construction and materials of natural ventilation and HVAC system
- Functional and aesthetical aspects of services layout for comprehensive architectural design.

## **Teaching Plan:**

### **Unit I: Natural Ventilation**

- 1.1. Indicators for comfortable condition
- 1.2. Wind and stack effects, evaporative cooling
- 1.3. Examples (book/ on site ): Implementation of various methods of natural and composite ventilation system in architectural design

### **Unit II: Mechanical ventilation**

- 2.1. Forced ventilation system
- 2.2. Types of fans and blowers
- 2.3. Mounting, sizes and calculation of fans

### **Unit III: Air-conditioning system 1**

- 3.1. Principles of air-conditioning system
- 3.2. Components of air-conditioning system

### **Unit IV: Air-conditioning system 2**

- 4.1 Types of conventional systems of air-conditioning
- 4.2 Non-conventional systems of air-conditioning

### **Unit V: Air-conditioning 3**

- 5.1 Air-conditioning layout calculation
- 5.2 Air-conditioning layout design

### **Unit VI: Air-conditioning 4**

- 6.1 On site case study: Air-conditioning system

## **SESSIONAL WORK: (with marking scheme)**

- Tutorials for four Units (I to IV): 25% marks
- Layout of air-conditioning (preferably architectural design of the earlier semester to be considered): 50% marks
- On site Case study: 25% marks

## **REFERENCE BOOKS**

1. Tricomi, Ernest. *ABC of Air-conditioning*. 1970
2. Smith, Philips & Sweeney. *Environmental Science*
3. Daniels, Klaus. *Advanced Building Systems – A Technical Guide for Architects and Engineers*. Birkhauser, Boston. 2003
4. National Building Code of India

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<b>History of Architecture IV</b>			
SubjectCode		3201542 (SS)	
TeachingScheme		ExaminationScheme	
TotalContact Periodsperweek (lectures=2, Studio=1)	3	Sessional(Internal)	25
		Sessional(External)	25
		Viva (Internal)	nil
		Viva (External)	nil
		In-semester exam	nil
		End Semester exam	nil
		TotalMarks	50
		Total Credits	2

### COURSE OBJECTIVES:

- To understand the architecture and architectural discourse in the nineteenth and twentieth centuries and the various factors like industrialization, modernity, wars, global-local concerns, etc. that shaped it.
- To get acquainted with various important architectural works and the contribution and role of individual designers that distinctively marked the course of architecture in the nineteenth and twentieth centuries.

### COURSE OUTLINE:

- The course intends to present architecture as a product of its times especially with reference to the salient socio- political, cultural, economic and technological markers of the nineteenth and twentieth centuries. It also intends to bring out the plurality of approaches as a response to the above contexts and examine the different strands of architectural practice and works that developed as a result.
- The study should include examples of architectural works and designers drawn from across the world wherever relevant and necessary while also emphasizing the happenings in India.
- The course should inculcate an analytical thinking about architecture, introduce various theoretical positions, and train the students to research and isolate a thought of their own.

#### Unit 1: **Architecture of the Industrial Period**

Revivalism

Introduction of steel and glass as new materials in architecture

New building types

Reactions to Industrialization: Arts and Crafts, Art Nouveau

#### Unit 2: **Architecture of the Twentieth Century**

Stylistic explorations: Expressionism, De Stijl, Art Deco, etc.

Influences like various manifestoes, congresses, writings, Bauhaus

Modernism and International style

Experiments and explorations around the world

Development of the high-rise

Influential Designers: Frank Lloyd Wright, Mies van der Rohe, Le Corbusier, Louis Kahn, etc.

#### Unit 3: **Architecture of India**

Colonial architecture: European Revivalist and Indian adaptations

Search for a National idiom: Claude Batley to G BMhatre

Indian Modernists: AchyutKanvinde, Charles Correa, BalkrishnaDoshi, etc.

Influence of Indian works of international architects



## SESSIONAL WORK:

The sessional work shall comprise of individual/ group work of the students completed under the guidance of the subject teacher as follows:

1. Journal: Hand written notes and manually drawn sketches of relevant examples of most of the contents mentioned above. Journal is an individual work. 20 marks
2. Project work: An exploratory or critical report/ graphical presentation/ analytical models/ tutorials/ etc. based on any relevant topic from the contents mentioned above. Project work could be undertaken in groups such that the contribution of individual students in the group is identifiable. 30 marks

## REFERENCE BOOKS

1. Bhatt, V., & Scriver, P. (1990). *Contemporary Indian Architecture- After the Masters*. Ahmedabad: Mapin Publishing.
2. Chhaya, N. (Ed.). *Harnessing the Intangible*. New Delhi: National Institute of Advanced Studies in Architecture.
3. Ching, F. D. (1997). *A Visual Dictionary of Architecture*. New York: Van Nostrand Reinhold.
4. Correa, C. (2010). *A Place in Shade*. Delhi: Penguin Books.
5. Curtis, W. (1988). *Balkrishna Doshi- An Architecture for India*. New York: Rizzoli International.
6. Curtis, W. J. (1996). *Modern Architecture Since 1900*. London: Phaidon Press.
7. Dhongde, S., & Sahasrabudhe, C. (Eds.). (2009). *Achyut Kanvinde*. Pune: BNCA Publication Cell.
8. Didee, J., & Gupta, S. (2013). *Pune - Queen of Deccan*. Pune: INTACH Pune Chapter.
9. Dwivedi, S., & Mehrotra, R. (2008). *Bombay Deco*. Mumbai: RMA Architects.
10. Ford, E. R. (1997). *The Details of Modern Architecture*. MIT Press.
11. Frampton, K. (1992). *Modern Architecture- A Critical History*. London: Thames and Hudson Ltd.
12. Jain, K. (2012). *Architecture- Concept to the Manifest*. Ahmedabad: AADI Centre.
13. Kagal, C. (Ed.). (1986). *Vistard- The Architecture of India*. Bombay: The Festival of India.
14. Kanvinde, A., & Miller, H. (1959). *Campus Design in India*. Topica-rosens/American Yearbook Co.
15. Lang, J., Desai, M., & Desai, M. (1997). *Architecture and Independence: The search for identity, India- 1880 to 1980*. New Delhi: Oxford University Press.
16. Pallasmaa, J. (2009). *The Thinking Hand : Existential and Embodied Wisdom in Architecture*. London: John Wiley and Sons Ltd.
17. Pandya, Y. (2013). *Concpets of Space in Traditional Indian Architecture*. Ahmedabad: Mapin Publishing.
18. Pandya, Y., & Foundation, V. S. (2007). *Elements of Space Making*. Ahmedabad: Mapin Publishing Pvt Ltd.
19. White, S. (1995). *Building in the Garden: Architecture of Joseph Allen Stein in India and California*. Delhi: Oxford India Paperbacks.
20. Wolfe, T. (1981). *From Bauhaus to Our House*. New York: Farrar Straus Giroux.

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WORKING DRAWING II			
Subject Code		3201543(SS)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2, Studio=2)	4	Sessional (Internal)	50
		Sessional (External)	50
		Viva (Internal)	Nil
		Viva (External)	Nil
		In-semester exam	nil
		End Semester exam	nil
Total Marks		100	
Total Credits		3	



### COURSE OBJECTIVES:

- To Introduce idea of Design Development and detailing and its relevance in converting 'concept design' to working drawing and hence the realization of design on site.
- To imbibe further the importance of working drawings as an essential tool for effective site execution and execution of a building contract.
- To expose to the standard methods, conventions, drawing annotations including International standards, IS codes, its application in working drawing set with material and component and schedules.

### COURSE OUTLINE:

- Lecture demonstration/s to elaborate on standard practices, conventions, graphic annotations, sequencing and cross reference systems of a good working drawing set.
- Design development and detailing of own **design** to resolve the design idea to one which can be executed/ constructed, exposing students to construction parameters, limitation and sequencing.
- Generating a working drawing set for the **chosen design/ building** with framed/composite construction including schedules of material, finishes, components and accessories
- Developing and drafting details of Civil work and furniture including schedule of finishes

### SESSIONAL WORK:

- Preparing a manually drafted/ CAD generated **working drawing** set of 'own design project' with carpet area not less than 250 Sq. M. and at least Ground plus one storied building having framed/composite construction. **The set to also include** at least two civil details out of following.

- I. Façade / skin of the building with fenestration and weather protection.
- II. Stairway, staircase
- III. Public Washroom

And

Any one detail related interior finishes/ custom made furniture of following

- IV. Floorings,
  - V. False ceiling
  - VI. Paneling or partitions
  - VII. Built in or stand alone furniture
- A rough folio comprising of design development drawings, sketches supporting the final working drawing set shall be retained by the candidate.

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# **Third year 2015 Pattern**

## **Semester VI**

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## DESIGN VI

<b>Design VI</b>			
Subject Code		3201544(SV),3201545(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week= 11 (lectures=3, Studio=8)	11	Sessional (Internal)	100
		Sessional (External)	100
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	nil
		End Semester exam	100 [12 hours duration – to be conducted 6 hours for two days en-lodge]
		Total Marks	350
		Total Credits	7

### COURSE OBJECTIVES:

- Designing a building by stacking of different functions vertically and addressing various concerns such as coordinating various building services, vertical circulation, basement parking, and structural grids with introduction to disaster management design strategies/techniques and universal design.

### COURSE OUTLINE:

- Introduction to various concerns of building design in an urban context on sites with limited areas there by necessitating multi storied buildings.
- Strengths and weaknesses of horizontal vis a vis vertical spatial arrangements in buildings.
- Study of buildings in which vertical arrangements are desired.
- Design and layering of different activity areas with different spatial scales.
- Coordination of various building services such as water supply, lifts, drainage, garbage disposal, lighting, air conditioning etc.
- Exposure to natural disaster management or disaster management through design mitigation.
- Exposure to Universal Design or Accessible Design concept.

### SESSIONAL WORK:

- A major design project of duration 10-12 weeks of a building complex. Example : Hotel, Hospital, Office building, commercial complex, bus station etc.
- A minor design project of duration 4-6 weeks which could be stand alone building on a site with area not less than 1500 sq.m. It is recommended that the minor project may be programmed to integrate knowledge of art-architecture history, contemporary art-architecture movements learnt by the student in history / contemporary architecture seminar.
- One time bound project of duration around 12 hours. The typology and scale of the project can be decided by the college.

**Important Note :** At least one of the two projects [major or minor] mentioned above has to be in a different socio geographic context. The design has to be communicated through architectural graphics, two and three-dimensional sketches, models and narratives. All the design projects must have different sites.



## REFERENCE BOOKS

It is strongly recommended that students refer books focusing on various building types, journals, magazines to widen their knowledge of design and the readings not to be limited to the list of books given below.

1. Correa, C. (2010). *A Place in Shade*. Delhi: Penguin Books.
2. Kanvinde, A., & Miller, H. (1969). *Campus Design in India*. Topeka: ostens/American Yearbook Co. .
3. Lynch, K. (1962). *Site Planning*. MIT Press.
4. Pandya, Y., & Foundation, V. S. (2007). *Elements of Space Making*. Ahmedabad: Mapin Publishing Pvt Ltd.
5. White, S. (1995). *Building in the Garden: Architecture of Joseph Allen Stein in India and California*. Delhi: Oxford India Paperbacks.

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<b>Building Technology and Materials-VI</b>			
Subject Code		3201546(PP), 3201547(SV)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3, Studio=4)	7	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	30
		End Semester exam	70
		Total Marks	200
		Total Credits	5

## COURSE OBJECTIVES:

- To understand the construction of basement along with its waterproofing, provision for access and ventilation details. To understand the construction of different types of retaining walls and the detailing of the same.
- To understand issues and construction of earthquake resistant frame structures.
- To understand the concept of modular co-ordination and industrialized building construction along with precast technology.
- Introduction to steel structures and detailing of trusses and deck floors.

## COURSE OUTLINE:

**Unit-1:** Characteristics, Properties and types of following materials and their application in buildings.

- a) Glass
- b) Metal & Metal alloys
- c) Plastics and rubbers
- d) Adhesives and sealants



**Unit 2:** Earthquake resistant frame structures.

1. Ductility and Rigidity of building and earthquake loads
2. Overview of earthquake resisting structural systems.
3. Application of Moment resisting frames, crossed braced frames and shear wall for Earthquake resistance structures.
4. Role of Floor and Roof Diaphragm in earth quake resistance.
5. Retrofitting and base isolation.

**Unit-3:** Single basement construction along with waterproofing details, alternative ways of providing and constructing access and provisions to be made for ventilation.

**Unit-4:** Retaining wall and its terminology (mass/gravity retaining, cantilever retaining, counter-fort retaining wall and precast retaining wall, etc.)

**Unit 5:** Steel structures -

- a) Structural steel sections, Built-up sections.
- b) Assembly of steels structure with trusses with north light truss (Industrial building)
- c) Multi-storey steel building assembly with stanchion, beams and metal deck flooring.

**Unit 6:** Modular co-ordination and Industrialized building construction, Planning and construction details.

1. Precast floor and roof construction along with the following systems developed by CBRI.
2. Floor and roof construction using partially precast planks and joist.
3. Floor and roof construction using precast Waffle unit.
4. Introduction to locally available proprietary Precast systems.

**SESSIONAL WORK:**

Unit-1: Compilation of market surveys in form of relevant hand drawn sketches, notes and tabulated information regarding; available types, commercial sizes, properties, unit of measurement, rates etc.

Unit-2: Sketches and notes in the journal.

Unit-3: Manually drafted scaled drawings of Single and multi-basement construction with various types of waterproofing Techniques. Information on materials and methodology for waterproofing should be included in the journal.

Unit4: Sketches and notes in the journal.

Unit5: Manually drafted scaled drawings of various steel trusses, north light truss etc with details of fixing of roofing sheets and sheet cladding. Details of multi-storied steel structure with construction of steel deck and steel staircase.

Unit6: Manually drafted scaled drawings of modular coordinated building using precast building components. Sketches and notes in the journal.

**REFERENCE BOOKS**

1. Central Public Work Department, Indian Building Congress. Handbook on Seismic Retrofit of Buildings. Narosa Publishing House. 2008 Andrew Charleson. Seismic Design for Architects: Outwitting the Quake. Elsevier Ltd 2008
2. Terri Meyer Boake. Understanding Steel Design: An Architectural Design Manual. Birkhauser Basel 2012.



3. Stephen Emmitt. Barry's advanced construction of buildings. Wiley, 2006
4. Central Public works Department CPWD), IBC, CEAI & CCPS. Guidelines on use of Glass in Buildings - Human Safety.
5. Mackay J.K. Building Construction vol.-1-4. Longman Scientific & Technical, 1988.
6. IS 7921 : Recommendations for modular coordination in building industry Horizontal coordination
7. IS 7922 : Recommendations for modular coordination in building industry Vertical coordination
8. M. M. Mistry. Modular coordination & prefabrication, Principles of Modular Coordination in building.
9. BMTPC. Standards & Specifications for Cost-Effective Innovative Building Materials and Techniques. BMTPC 1996

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THEORY OF STRUCTURE VI			
Subject Code		3201548(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	3	Sessional (Internal)	nil
		Sessional (External)	nil
		Viva (Internal)	nil
		Viva (External)	nil
		In-semester exam	30
		Semester exam	70
Total Marks		100	
Total Credits		2	

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**COURSE OBJECTIVES:**

1. Types of RCC retaining walls and their use.
2. Different types of liquid retaining structures and their structural detailing.
3. Design of Steel structure elements by L.S.M.
4. To Develop in Students the Feel for **Structural Principles** and their Relates to Building Design
5. To Develop in Students the Concept that **“Every Structure is a System that Forms the Space”** and the fact that **Architecture and Structure cannot be conceived independently.**
6. To Develop in Students the fact that Structural Engineering is a Specialist Discipline and that the Architect has to appreciate the consultant’s concern and make an **informed** choice about the most appropriate Structural System for his Building with Reasonable Understanding of its **Economic and Operational Implications.**
7. To Develop in Students the Mathematical logic that would enable him to Design the Structural System for Ground +2l Storey R.C.C Structure and a medium span Factory Building in steel.
8. To instill in the Students a Confidence that they could develop and explore a Structural System of their own design and execute the same.



## COURSE OUTLINE:

### Unit 1: Retaining Walls

**R.C.C Cantilever Retaining Wall** - Proportioning and Need. **Numerical** on Stability and Design of Stem Reinforcement: **Theory only**. Detailing of Base Reinforcement, Shear Key, Retaining Wall without Toe and without Heel

1. **Counter Fort and Buttress type Retaining Walls** – **Theory only** on parts and Structural Action and Reinforcement Detailing
2. **Theory only** on Weep Holes and Effects of Surcharge on Retaining Walls

### Unit 2: R.C.C Water Tanks and Portal frames: *Theory only*:

#### a. Water Tanks

1. Joints in Water Tanks, Minimum Percentage of Steel, Other Standards.
2. R. C.C. Circular Water Tank with Flexible and Rigid Joint between Wall and Base -Concept of Hoop Tension – Reinforcement Detailing.
3. R. C.C. Square and Rectangular Water Tanks -Reinforcement Detailing.
4. R.C.C. Under-Ground Water Tanks - Pressure Conditions -Reinforcement Detailing.
5. Over Head Water Tank - An Intze Tank - Parts and General Detailing

#### b. Portal Frames: *Theory only*:

1. Basic Concept - Rigid, Two Hinged and Three Hinged Portal Frames with B.M.D.
2. Advantages and Disadvantages of R.C.C Portal Frame - Detailing of Hinged and Pinned Column to Footing Junction.
6. Advantages and Disadvantages of Steel Portal Frame - Detailing of Hinged and Pinned Column to Footing Junction, Rigidity at Beam to Column Junctions.

### Unit 3: Design of RCC structure:

- a) Total review of design of ground + two storied RCC building.
- b) Defining Structural system, different loads, Design sequence, transfer of load, actual design procedure.
- c) Understanding structural schedules and drawings.
- d) R.C.C Detailing- Diagrams from Schedules: Sketching Based on Given Schedule

### Unit 4: Design of Steel Structures

#### 1. Introduction to Limit State in Steel i.e. Plastic Design in Steel:

- a. **Theory only** on Yield Strength, Ultimate Strength, Partial Factors of Safety for Yield and Ultimate Strength, Shear, Load as per I.S.800 2007
- b. **Numerical** on Design on Steel Beams for Flexure, Shear and Deflection. Plastic Flexure Diagram,  $Z_p$  (Section Modulus Plastic). Classification of Sections as Plastic, Compact and Semi Compact.
- c. **Numerical** of Analytical type in Increasing the Strength of a Beam Section by adding Flange Plates.
- d. **Theory only** on Castellated Girders, Plate Girders and Gantry Girders.
- e. **Numerical** on Design of Stanchions in Limit State and **Analytical Numerical** on Stanchion with Flange Plates to Increase Their Strength:
- f. **Numerical** on Design of Compound Stanchions - Design and Analytical Problem.
- g. **Theory only** on Lacing and Battening Systems – I.S. Provisions – Need and Sketches.



h. **Theory only** on Moment Resisting Columns – for wind load and gantry load.

**Unit 5: Elements of a Factory Building in Steel Structures:**

- a) Total review of design of medium span factory building in steel.
- b) Structural systems, different loads, Design sequence, transfer of load, actual design procedure.
- c) Understanding structural drawings.

**Unit 6: Advance structural systems for long span and high rise buildings**

1. Long span structural systems like, cable structure, arches, shell, dome, vaults, folded plate, geodesic domes, space frames, tensile structure, fabric etc
2. Appropriate use of structural system in Architectural design.
3. Advantages and disadvantages of different systems.
4. High rise buildings structural system like Rigid frame, Framed truss, Framed tube, Tube in tube, Shear wall etc.

**References :**

1. R.C.C. design – Khurmi, Punmia, Sushilkumar.
2. Design of steel structures- L. S. Negi., Vajrani-Ratwani.
3. Structure in Architecture – Salvadori and Heller.
4. Structural Decisions.- F. Rosenthal
5. I.S. 456, I.S. 800, I.S. 875, I.S. 1893, I.S. 13920

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DRAFT SYLLABUS FOR APPROVAL OF FACULTY

<b>LANDSCAPE ARCHITECTURE II</b>			
SubjectCode		3201549(SS)	
TeachingScheme		ExaminationScheme	
TotalContact Periodsperweek (lectures=1, Studio=3)	04	Sessional(Internal)	25
		Sessional(External)	25
		Viva (Internal)	nil
		Viva (External)	nil
		In-semester exam	nil
		End Semester exam	nil
TotalMarks		50	
Total Credits		2	

**COURSE OBJECTIVES:**

- To study use of Landscape design as a tool to address environmental concerns in Architecture.
- Application of site planning principles in integrated design of open and built spaces.
- To study the work of Master Landscape Architects and their contribution to built environment.

**COURSE OUTLINE:**

- **Unit 1.** Study of Works of Master Landscape Architects like Humphrey Repton, Andre Le Notre, 'Capability' Lancelot Brown, William Kent, Sir Geoffrey Jellicoe, Fredrick Law Olmstead and Calvert Vaux, Ian Mcharg, Lawrence Halprin, Gertrude Jekyll, Edwin Lutyens, Dan Kiley, Luis Barragan, Bernard Tschumi, Peter Walker, Martha



Schwartz, Robert Burle Marx, Geoffrey and Bevis Bawa, Ram Sharma, Mohammad Shaheer, Ravindra Bhan, Prabhakar Bhagwat, etc. and contemporary landscape projects.

- **Unit 2.** Introduction to site services like lighting and water management to be integrated in the landscape design project II.
- **Unit 3.** Landscape design Project : Essentially related to III Year Architectural Design studio (sem V / VI) which demonstrates application of all studied theory units.

### SESSIONAL WORK:

- Assignment based in the form of drawings /report/ presentation on theme based topics from Unit 1 wherein the students are encouraged to critically appraise the works of the landscape architects, understand various design approaches, undertake comparative studies, region specific design language etc. Duration 4-6 weeks.
- Portfolio comprising of drawings , views, model (optional) representing built and open space relationship, circulation (vehicular and pedestrian) parking, levels , schematic planting, schematic site services, material palette , nomenclature of outdoor spaces. All the theoretical aspects in Semester V and VI must be applied in this Landscape design Project II. Duration 10-12 weeks.

### REFERENCE BOOKS

1. Mcharg, I, *Design with Nature*. John Wiley and co. 1978.
2. Jellicoe, G and Jellicoe, S, *The Landscape of Man*, London: Thames and Hudson, 1991.
3. Simonds, J .O, *Landscape Architecture: The Shaping of Man's Natural Environment*, N Y: McGraw Hill Book Co.Inc. 1961.
4. Lynch, K, *Site Planning*, Cambridge: The MIT Press, 1962.
5. Shaheer, M, Wah-Dua, G and Pal A (editors), *Landscape Architecture In India. A Reader*: LA, Journal of Landscape Architecture, 2013.
6. Lyall, S, *Designing The New Landscape*: UK:Thames and Hudson, 1998.
7. Dee, C, *Form And Fabric In Landscape Architecture: A Visual Introduction*, UK: Spon Press, 2001.
8. Eckbo, G, *Urban Landscape Design*, N Y: McGraw hill co. 1961.
9. Laurie, M, *An Introduction to Landscape Architecture*, N Y: American Elsevier Pub. Co. Inc. 1975
10. Rutledge, A J. *A Visual Approach to Park Design*. New York: John Wiley and Sons, 1985.
11. Randhawa, M S, *Flowering Trees*, New Delhi: National Book Trust, 1998.
12. Bose, T K and Choudhary, K, *Tropical Garden Plants in Colour*, Horticulture and Allied Publishers, 1991.
13. Krishen, P. *Trees of Delhi: A Field Guide*, Penguin India, 2006.
14. Mukherjee, P, *Trees of India (WWF Natures Guide)*, Oxford, 2008.
15. Sahni, K C, *The Book of Indian Trees (Bombay Natural History Society)*, Oxford, 1998.
16. Krishna, N and Amrithalingam, M, *Sacred Plants of India*, Penguin Books Limited, 2014.
17. Motloch, J. L, *Introduction to Landscape Design*, US: John Wiley and Sons, 2001.
18. Dines, N and Harris, C, *Timesavers Standards for Landscape Architecture*, McGraw Hill Education, 1998.
19. Reid, G, L, *Landscape Graphics*, Watson-Guptill, 2002.
20. Botkin, D. B and Keller, E. A, *Environmental Science: Earth As a Living Planet*, N Y: John Wiley And Co. 1995.
21. Grosholz, E, *The Poetics of Landscape Architecture*, University of Pennsylvania Press, 2010.

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<b>BUILDING SERVICES IV</b>			
Subject Code		3201550 (SS) 3201551(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (Lectures = 2 Studio = 2)	4	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	nil
		Viva (External)	nil
		In-Semester exam	30
		End-Semester exam	70
		Total Marks	150
		Total Credits	3

### **COURSE OBJECTIVES:**

- To understand building services as integral part of comprehensive architectural design
- To obtain knowledge for fire safety measures and aspects of good acoustics and treatment in comprehensive architectural design

### **COURSE OUTLINE:**

- Fire fighting: Active and passive criteria as norms, recommendations, components, and specifications of construction and materials used for fire-fighting system in a building
- Acoustics: Properties of sound, Technical aspects of acoustic layout for comprehensive architectural design.
- Comprehensive architectural design for both fire fighting and acoustics

### **Teaching Plan:**

#### **Unit I: Fire Fighting I**

- 1.1. Fire triangle, Causes and spread of fire in buildings, fire resistance
- 1.2. Active control systems of fire: fixed and portable fire fighting equipments

#### **Unit II: Fire Fighting II**

- 2.1. Passive control of fire: fire safety codes, rules and regulations

#### **Unit III: Acoustics I**

- 3.1. Properties and defects of sound
- 3.2. Parameters for good acoustical condition of a room

#### **Unit IV: Acoustics II**

- 4.1. Noise control methods for air-borne and structure-borne noises
- 4.2. Acoustical materials and construction
- 4.3. Sound amplification system

#### **Unit V: Acoustics III**

- 5.1. Reverberation time calculation and recommendations for acoustical treatment
- 5.2. Acoustical treatment Layout design





## SESSIONAL WORK:

- Tutorials for four Units (I to IV): 25% marks
- Reverberation Time calculations and recommendations for acoustical treatment with layout (preferably architectural design IV of the earlier semester to be considered): 50% marks
- Live case study: 25% marks

## REFERENCE BOOKS

5. Leslie, Doelle. *Environmental Acoustics*. McGraw Hill.1972
6. Kundsen, V.O. & Harris, C.M. *Acoustical designing in Architecture*. John Wiley. 1950
7. Egan, M. David. *Architectural Acoustics*. McGraw-Hill, NY.1988
8. Mehta, Madan, Johnson, J., Rocafort, J. *Architectural Priciples and Design*. Prentise\_Hall, NJ. 1999
9. National Building Code of India

CONTEMPORARY ARCHITECTURE SEMINAR			
Subject Code		3201552 (SS)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=3)	4	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	-
		Viva (External)	-
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	50
		Total Credits	3

## COURSE OBJECTIVES:

- To establish a critical and comprehensive viewpoint about the contemporary trends/approaches in architectural production in terms of design, practices, its perception, appreciation and critical discourses.
- To develop the ability in students to position themselves in today's time so as to be able to establish an argument and testify the same.

## COURSE OUTLINE:

- Course aims at critical inquiry into the contemporary (post 1980s) thought processes involved in architectural production, its perception and appreciation.
- Seminar should encourage students to assess and establish their relevance and/or validity in today's context.
- Though it's a seminar course, subject teachers are advised to take introductory lectures about today's (post 1980s) trends, various critical discourses and current architectural issue so as to put students in the frame of critical thinking.



## SESSIONAL WORK:

Each student to write a paper of about 1500-2000 words critically discussing or deliberating the current phenomenon in architecture especially related to its production and appreciation. Preferably paper should be focusing on local and regional issues in architecture. This paper to be presented at the end of the semester orally with the help of computer media as required.

Students should be encouraged to write this paper manually and to follow the formalities of writing a paper in terms of references and acknowledgements.

Students should be assessed primarily for the identification of issues, ability to take position and development of an architectural argument.

## REFERENCE BOOKS

1. Hays, K. Michael. *Architecture Theory since 1968 (2000)*. MIT Press., Oct 1997, Feb. 2000.
2. Buchanan, Peter. "*The Big Rethink*". The Architectural Review (AR), (Articles – December 2011, January to May 2012, July – September 2012, November 2012)
3. Leach, Neil. *Anaesthetics of Architecture*, MIT Press, 1999
4. Plasmas, Juhani. *The Eyes of the Skin: Architecture and the Senses*. Academy Press, 2 edition, 2005
5. Correa, Charles. *A Place in the Shade: The New Landscape and Other Essays*. Penguin Books India, 2010.
6. Mehrotra, Rahul. *Architecture In India: Since 1990*. Pictor Publishing, 2007.

# DRAFT SYLLABUS FOR APPROVAL OF FACULTY

ELECTIVE I – INTERIOR DESIGN			
Subject Code		3201553(SS)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1,Studio=2)	03	Sessional (Internal)	25
		Sessional(External)	25
		Viva	NIL
		In-semester exam	nil
		End Semester exam	nil
Total Marks		50	
Total Credits		2	

## COURSE OBJECTIVES:

- To enable students to comprehend relationship between Architecture and Interior Design as a Space making disciplines.
- To evolve understanding about thoughtful design of interior spaces & how it can increase efficiency and add depth and meaning to the built environment.
- To enable students to comprehend the connection that the subject of Interior design has with other Design Disciplines like Conservation, Preservation, Restoration, Sustainability, Art ,Product design and Graphic design.







<b>DESIGN VII</b>			
Subject Code		4201554 (SV)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week= 12 (lectures=3, Studio=9)	12	Sessional (Internal)	100
		Sessional (External)	100
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	250
		Total Credits	8

### Course Objective

Subject aims at preparing the students to handle complex architectural issues at this stage addressing various challenges in terms of scale, complexity of functions, social economic context, traffic and vehicular movement and so on. Along with the challenges of physical issues, students are also now expected to address spatial and visual language of their project with reference to the urban context and setting of their site.

### Course Outline

- Multifamily Residential Development with Focus on : Mixed Use Development, Development of Communities, Addressing Issues of Social Stratification v/s Inclusiveness, Identification of target Group/ End User's requirement, Relation of Location/ Land values on Defining the Housing Product, Project being part of the City, Context, Green Initiatives, Efficient Planning of Services Minimum Area 100 to 200 depending on Context and Complexity. Designed within parameters as laid out by Local Authority and NBC.
- One Esquee / Charette be undertaken in each of the Terms ( One week Duration) exploring design solution for a project / component , ideas for which would help the Main Design project.

### Submissions

The design has to be communicated through architectural graphics, two and three-dimensional sketches, models and narratives.

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<b>ADVANCED BUILDING TECHNOLOGY AND SERVICES I</b>			
Subject Code		4201555 (SV)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week= 07 (lectures=3, Studio=4)	07	Sessional (Internal)	75
		Sessional (External)	75
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	200
		Total Credits	5



**COURSE OBJECTIVES:**

- To introduce advanced structural systems, materials and services required in buildings with complex and special requirements and enable the students to integrate the same in design.

**COURSE OUTLINE:**

Unit 1 .Multi-basements. Design and construction of multi-basements giving constructional details required for natural Lighting, ventilation and surface water disposal. Study of various methods of access to parking areas other than ramps. Drawings to include application of all required services. [Minimum four A1 drawings]

- Unit 2. Industrial Buildings. : Types of roofing systems, PEB systems, Proprietary systems, Industrial flooring.  
Assignments. Drawings showing structural system, construction details and services in plan, section and elevation [minimum two A1 drawings]
- Unit 3. Swimming pools.  
Design and construction of swimming pools ( Olympic size, semi Olympic, leisure pools) and study of situations such as -- at ground level , podium level and upper / roof level with reference to all constructional and services details. [Minimum two A1 drawings]
- Unit 4 Study of long span structures [indoor stadia, railway / metro stations, shopping malls, sky walks etc] in RCC and Steel to understand structural behavior. Introduction of lighting and ventilation of spaces in such large buildings.  
Assignment would comprise of Case study report and construction details in sketch form.

**SESSIONAL WORK:**

- Drawings / sketches / notes to be as mentioned in the course outline above. Computerized drawings may be allowed only when individual design / detailing is undertaken.

**REFERENCE BOOKS**

PEB manufacturer's details  
Advanced Building Construction By MACKEY  
Stadia by John Geraint

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<b>PROFESSIONAL PRACTICE I</b>			
Subject Code :		4201556(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week = 3 ( Theory Lectures – 1 + studio -2)	03	Sessional ( Internal )	Nil
		Sessional ( External )	Nil
		In-semester exam	30
		End Semester exam	70
		<b>Total Marks</b>	100
		<b>Total Credits</b>	2

**COURSE OBJECTIVES:**

- To acquaint the Student with the Role and Stature of an Architect in Society, and understand the duties, responsibilities, liabilities and ethics as a professional.



- To acquaint the Student with the Scope and Avenues of professional Architectural services, and the demands and Mode of professional practice, and to prepare the Student for the professional field.
- To familiarize and prepare the Student with adequate knowledge of an Architect's office administration, documentation and procedures of office and site management to enhance his comprehension and utility during his professional training in the field in Semester IX.

**COURSE OUTLINE :**

- Unit 1 Introduction to the nature, scope and avenues of service and professional practice as an Architect. Define the Role of an Architect as a technical professional - who is not a Trader or a Businessman. Illustrate the changing nature of the Architects profession- Local & Global competition in the field.
- UNIT 2 The Architects Act 1972 - The Council of Architecture, its composition, legal status and mandate for to Registration of Architects and for monitoring the Academics and Profession of Architecture, Rules and Regulations of the Council regarding Professional Liabilities & Code of Conduct.
- Unit 3 Avenues of Professional service and mode and nature of professional Practice - Types of Organisations - Scope of comprehensive Services, Scale of Fees, and Office Management, Project management, Site supervision, Documentation, Taxation, Banking and Insurance.
- Unit 4 Architectural Competitions - Pros and Cons - with Rules and Regulations of the Council.
- Unit 5 Introduction to IIA, IIID, IUDI, ITPI, ISOLA and such professional organisations and the need for Architects to be aware, sensitive and active in Social and Civic issues in Urban context.

**REFERENCE BOOKS :**

- |   |                                       |
|---|---------------------------------------|
| 1) Handbook of Professional Documents   | - Council of Architecture publication |
| 2) The Architects Act, 1972             | - Govt. of India publication          |
| 3) Professional Practice                | - By Roshan H. Namavali               |
| 4) Professional Practice in India       | - By Madhav G. Deobhakta              |
| 5) Architectural Practice and Procedure | - By Vasant .S. Apte                  |

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<b>URBAN STUDIES-I</b>			
Subject Code		<b>4201557 (SS)</b>	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	03	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	nil
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	50
		Total Credits	02

**COURSE OBJECTIVES:**

- To enable students to understand the urban context of an Architectural Project beyond the site and understand the implications of various factors (such as traffic-transportation, socio economics, urban landscape, spatial and visual aspects etc) influencing the development of an urban area.
- To introduce the students to urban planning and design theories and concepts and enable them to undertake planning and design of large scale land development.







- Unit IV – Methods of research in architecture. Use of surveys, observations, experiments, secondary sources.

**SESSIONAL WORK:**

- Tutorial based on all of the above units
- Literature Review of at least 5 papers related to the topic of their choice.
- Research proposal giving details of aims, objectives, scope, limitations, methods, samples selected on the topic approved by the head of the institution.

**NOTE:**

- The guide must have minimum 5 years of teaching experience. Preferably a guide should not guide more than 8 students.
- It is desirable that the research seminar is presented in front of experts.
- It is beneficial to the students if the topic is related to the architectural design project of semester X.

**REFERENCE BOOKS**

1. Babbie, E. *The Practice of Social Research*. third edition. Belmont: Wadsworth Publishing Co., 1983. book.
2. Cresswell, J.W. *Research Design: Qualitative and Quantitative Approaches*. Thousand Oaks: Sage, 1994. Book.
3. De Vaus, D.A. *Surveys in Social Research*. Jaipur: Rawat Publications, 2003. Book.
4. Dey, I. *Qualitative Data Analysis: A User Friendly Guide for Social Scientists*. London: Routledge, 1993. Book.
5. Groat, L. & Wang, D. *Architectural Research Methods*. New York: John Wiley and Sons Inc., 2002. Book.
6. Kothari, C.R. *Research Methodology: Methods and Techniques*. New Delhi: Wishwa Prakashan, 2005. Book.
7. Michelson, William. *Behavioural Methods in Environmental Design*. Stroudsburg, Pennsylvania: Dowden, Hutchinson and Ross, Inc., 1982.
8. Nachmias, C.F. & Nachmias, D. *Research Methods in Social Sciences*. Great Britain: St. Martin's Press Inc., 1996. Book.
9. Patton, M.Q. *Qualitative Evaluation Methods*. Newbury Park: Sage Publications, 1980. Book.
10. Sanoff, H. *Methods of Architectural Programming*. Vol. 29. Dowden Huthinson and Ross, Inc., 1977. document.
11. —. *Visual Research Methods in Design*. USA: Van Nostrand Reinhold, 1991.

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<b>Quantity Surveying And Estimation - I</b>			
Subject Code		4201559 (PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	03	Sessional (Internal)	Nil
		Sessional (External) Viva (Internal)	Nil
		Viva (External)	Nil
		In-semester exam	30
		End Semester exam	70
		Total Marks	100
		Total Credits	2



## COURSE OBJECTIVES:

- To Introduce Estimation as an important Subject for Architecture.
- To Understand Different methods of Computing Quantities for items of work in a structure.
- To enable students in working out quantities of various items of work for simple load bearing and R.C.C. framed structure and acquaint them with various types of estimates including standard method of measurement on building works and mode of measurements as adopted by I.S 1200.

## COURSE OUTLINE:

- Unit I.** Introduction to Quantity Surveying and Estimating, Data for Estimate, Purpose of Estimating, Accompaniments of an Estimate, Qualities of an Estimator, Spot Items, Contingencies, Prime Cost & Provisional Sums, Provisional Quantities, Extra Items of work.
- Unit II.** Different types of Estimate their uses & Characteristics, Schedule of Quantities, Schedule of Rates & its uses, Stages of work, Complete Estimate of a Project, Methods of taking out Quantities, Measurement Sheet, Abstract Sheet, Bill of Quantities,
- Unit III.** Study of mode of measurement as stipulated in IS-1200, Classification of strata as per IS-1200, Trial pit data, Lift and Leads , Unit of Measurement.
- Unit IV** Bill certification, Part rate certification, Interim/Running Bill Certification,
- Unit V** Working out quantities for load bearing structure (below plinth only) of approximately 15-30 Sqm by offset and centre-line method illustrating L and T junctions and preparing measurement sheet and abstract for all items of work.
- Unit VI** Working out quantities for R.C.C. G+1 structure of approximately 150-200 sqm and preparing measurement sheet and abstract for all items of work.

## REFERENCE BOOKS

1. *B.I.S 1200- Part-I 1992.* n.d.
2. Prof. B.N.Dutta, *Estimating and Costing in Civil Engineering.*
3. B.S.Patil. *Civil Engineering Contracts and Estimates.*
4. Dr. Roshan Namavati. *Professional Practice.*
5. Rangawala. *Estimating Costing and Valuation.*

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<b>Specification Writing I</b>			
Subject Code		4201560 (PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (Lectures = 1 Studio = 2)	3	Sessional (Internal)	nil
		Sessional (External)	nil
		Viva (Internal)	nil
		Viva (External)	nil
		In-Semester exam	30
		End-Semester exam	70
		Total Marks	100
		Total Credits	2

### **COURSE OBJECTIVES:**

- To acquaint students with methodology of writing specifications with reference to building trades, materials, workmanship & performance of different items of work.
- To know importance of specifications in contract document for any construction project.

### **COURSE OUTLINE:**

- Techniques, Importance & methods of writing different types of specifications of different items of works in construction.
- Technical and functional role of specifications in any construction project.

### **Unit I: Specifications**

- 1.4. Definition, need & importance of Specification writing
- 1.5. Relation with working drawing, bill of quantities, schedule of rates
- 1.6. Specification as a integral part of contract document

### **Unit II: Types of Specifications**

- 2.1. Basic types like open, closed, restricted etc
- 2.2. Use of manufacturers guide
- 2.3. Combination of above types

### **Unit III: Specification writing (Workmanship )**

- 3.1. Item-wise detailed specifications including methods
- 3.2. Forms of writing descriptive notes on material and workmanship based on working drawing

### **Unit IV: Specifications for construction works**

- 4.2 Demolition work of existing buildings
- 4.2 Formwork

### **REFERENCE BOOKS**

1. Indian Standard specifications
2. C.P.W.D. Specifications and schedule of rates
3. Specification Writing for Architects & Engineers, By Donald A. Watson
4. Specification Writing for Architects & Surveyors, By Arthur J. Wills
5. Estimating, Costing, Specification & Valuation, By M. Chakraborty

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<b>ELECTIVE II - DESIGN &amp; TECHNOLOGY ELECTIVE</b>			
Subject Code		4201561(SS)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week= 2 (lectures=1, Studio=1)	2	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	50
		Total Credits	1

### **COURSE OBJECTIVES:**

The subject of Electives has been introduced in syllabus with specific intention of study of a particular subject of student's liking in greater detail but in the larger context of overall scope of Architecture syllabus at undergraduate level. This will give students an opportunity to develop their skills in a subject they may opt, to make their career in future.

The Design and technology elective aims at exploring the recent developments in the field of architecture from point of view of building design, services and construction. Aspects such as disaster resistance, accessibility, retrofitting, conservation, architectural design theory, can be addressed through these electives.

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### **COURSE OUTLINE:**

Individual College may offer topics depending upon the availability of experts and resource material. The colleges will have the opportunity to focus on a particular group of topics according to the overall philosophy and mission statement of the College. The probable elective topics are – [the list is only suggestive and individual colleges can frame newer topics which meet the course objectives].

- Universal Design
- Seismic Resistance design
- Services in High rise buildings.
- Design theory
- Architectural Conservation
- Computer & design
- Modular design
- Prefabricated & Precast construction
- Advanced Landscape Design

**Note :** The topics selected in this elective should not focus on any of the aspects of interior design.

### **SESSIONAL WORK:**

The faculty is expected to set out the broad contour and sub aspects of the particular elective and conduct input and demonstration interactions and define the nature of the sessional work to be done by the students.



The students are expected to present the work done in an **A4 report format of 20 pages**, to include summary of interactions and sessional work prescribed by the faculty with a signed certificate from the concerned Teacher / Expert stating that the study was carried out under his /her guidance and countersigned by the Principal / Academic coordinator.

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# DRAFT SYLLABUS FOR APPROVAL OF FACULTY



# **Fourth year 2015 Pattern**

## **Semester VIII**

DRAFT SYLLABUS FOR APPROVAL OF FACULTY



<b>DESIGN VIII</b>			
Subject Code		4201562(SV)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week= 12 (lectures=3, Studio=9)	Sessional (Internal)	100	
	Sessional (External)	100	
	Viva (Internal)	25	
	Viva (External)	25	
	In-semester exam	nil	
	End Semester exam	nil	
Total Marks		250	
Total Credits		8	

### Course Objective

Subject aims at preparing the students to handle complex architectural issues at this stage addressing various challenges in terms of scale, complexity of functions, social economic context, traffic and vehicular movement and so on. Along with the challenges of physical issues, students are also now expected to address spatial and visual language of their project with reference to the urban context and setting of their site.

### Course Outline [ Project type 1 – one of the two options & Project type 2]

1. Study of Urban Areas in terms of Urban level issues like Mobility, movement network, builtform, disposition, character, identity, activities, open space, networks, walkability, inclusiveness, etc.

Community participation initiatives and analysis.

Identify issues related to above aspects at Neighbourhood level and offer design solutions for improving the status of the neighbourhood with reference to the above aspects. Setting up of Guidelines to achieve the master plan objectives and broad implementation strategy to achieve sustainable neighbourhoods.

The project shall include a Study area and Master Plan area of 2- 3 Ha. with detailed Architectural Resolution of a component/s admeasuring not less than 10000 to 20000 sqm Area of Functional space depending on Context and Complexity.

The Architectural project should evolve of the study of the Area and be an outcome of issue formulation, Development Plan proposals for the area if any and a subset of the overall Master Plan for the Area.

**OR**

1. Multi Functional Complex of Buildings or Speciality Building in an Urban Context with substantial Complexity addressing Issues of Character, Identity, Builtform, Contextuality, Advanced Services, Green Initiatives , landscape integration, traffic management with impact on immediate surroundings, structural resolution in detail. Building Quantum not less than 10000 to 20000 sqm Area of Functional space depending on Context and Complexity and appropriate plot Area. ( eg. Healthcare facility, Educational Institution, 5 Star Hotel, Convention Centre, Multimodal Transport Hub, Shopping Mall and Multiplex, redevelopment project etc.).



Project should explore the Impact on the Surrounds and from the Surrounds with reference to the Urban Insert being proposed.

2. One Esquee / Charette be undertaken in each of the Terms ( One week Duration) exploring design solution for a project / component , ideas for which would help the Main Design project.

### Submissions

The design has to be communicated through architectural graphics, two and three-dimensional sketches, models and narratives.

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ADVANCED BUILDING TECHNOLOGY AND SERVICES II			
Subject Code		4201563 (SV)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week= 07 (lectures=3, Studio=4)	7	Sessional (Internal)	75
		Sessional (External)	75
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	200
		Total Credits	5

## DRAFT SYLLABUS FOR APPROVAL OF FACULTY

### COURSE OBJECTIVES:

- To introduce advanced structural systems, materials and services required in buildings with complex and special requirements and enable the students to integrate the same in design.

### COURSE OUTLINE:

- Unit 1. Auditoriums - Design and construction of Auditorium of min capacity 500 with provision of a balcony and application of all required services.  
All architectural drawings, framing plans and sections, showing all services and constructional detail for balcony [minimum four A1 drawings]
- Unit 2. Construction details of architectural features in design projects.  
Assignment -- Complete details with reference to materials used and details of construction. Minimum five working details to an appropriate scale. [Minimum 3 A1 size drawing].
- Unit 3. Introduction to high rise buildings.  
Behavior of high rise structures under different loading conditions. Understanding of structural systems for high rise structures. Assignment; Notes and sketches.
- Unit 4 Curtain walls-- Framing systems and construction details for a curtain wall.  
Assignment -- Students shall study cases of curtain wall and prepare working details for the same. [minimum one A1 size drawing].

### SESSIONAL WORK:





- Drawings / sketches / notes to be as mentioned in the course outline above. Computerized drawings may be allowed only when individual design / detailing is undertaken.

## REFERENCE BOOKS

Advance building construction by MACKEY  
 High Rise Buildings by JASWANT MEHTA  
 Theatres and Auditoriums by Harold Burris- Meyer & Edward Cole.  
 Architects Working Details

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<b>PROFESSIONAL PRACTICE II</b>			
Subject Code :		4201564 (PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week = 3 [Lecture 1, Studio 2]	3	Sessional ( Internal )	Nil
		Sessional ( External )	Nil
		In-semester exam	30
		End Semester exam	70
		<b>Total Marks</b>	<b>100</b>
		<b>Total Credits</b>	<b>2</b>

## COURSE OBJECTIVES:

- To acquaint the Student with the Role and Stature of an Architect in Society, and understand the duties, responsibilities, liabilities and ethics as a professional.
- To acquaint the Student with the Scope and Avenues of professional Architectural services, and the demands and Mode of professional practice, and to prepare the Student for the professional field.
- To familiarize and prepare the Student with adequate knowledge of an Architect's office administration, documentation and procedures of office and site management to enhance his comprehension and utility during his professional training in the field in Semester IX.

## COURSE OUTLINE:

- Unit 1 Introduction to Construction Management - Types and Systems of Tendering - Open and Invited Tenders - Pre-Qualification and Empanelment procedures - Selection of Contractors.
- Unit 2 Introduction to Contracts - Articles of Agreement and Conditions of Contract ( IIA document ) Contents of a Tender - Terms of Reference - Specifications - Bill of Quantities - Billing, Measurement of work and Payments - Advances and recovery - Bonus and Penalties, etc ..
- Unit 3 Introduction to National Building Code - ISI Codes and Standards, Limits and Tolerances.
- Unit 4 Role of Architects in Construction / Site management - Supervision and monitoring of Speed, Quality and Economy - Status on project sites - Meetings, Minutes, Instructions & Records.
- Unit 5 General Introduction to the Role and Legal duties of Architects in Arbitration and Valuation.

**SESSIONAL WORK :** Preparation of a JOURNAL with NOTES based upon the syllabus content. Journal to be submitted at the end of Term-II for Internal and External Marking.

## REFERENCE BOOKS :

- 1) Handbook of Professional Documents - Council of Architecture publication
- 2) The Architects Act, 1972 - Govt. of India publication



- 3) Professional Practice - By Roshan H. Namavati
- 4) Professional Practice in India - By Madhav G. Deobhakta
- 5) Architectural Practice and Procedure - By Vasant .S. Apte

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Urban Studies-II			
SubjectCode		4201565 (SS)	
TeachingScheme		ExaminationScheme	
TotalContact Periodsperweek (lectures=1, Studio=2)	03	Sessional(Internal)	25
		Sessional(External)	25
		) Viva (Internal)	nil
		Viva (External)	nil
		In-semester exam	nil
		End Semester exam	nil
		TotalMarks	50
		Total Credits	02

### COURSE OBJECTIVES:

- To introduce the students to the process of planning and urban development and associated legislation.
- To introduce the students to urban economics.

### COURSE OUTLINE:

- Study of planning process in detail (Survey, analysis, proposals and development)
- Conservation and related Urban Design controls
- Planning and Urban Design legislation- introduction and relevance
- Unified Building bye laws and Development Control rules of local authorities.
- Urban economics: introduction and concepts (demand and supply, housing finance, Government schemes and various bodies etc)

### SESSIONAL WORK:

- **Handwritten journal** based upon the theory syllabus as above.
- **Assignments:**
  1. Reading of Urban fabric: Study of existing town and town planning proposals for municipal council level town-(group work) (20 marks)
  2. Identification of urban issues related to various aspects such as environment, society, traffic and transportation, hills and hill slopes, riverfront development, urban heritage conservation through primary surveys( group work in a group of 5 students) (20 marks)
  3. One Tutorial based upon course outline (10 marks)

### REFERENCE BOOKS

Urban Pattern: Arthur Gallion  
 City in History: Lewis Mumford  
 Spreiergen, Paul. Urban Design: **The Architecture of Town and Cities**. Malabar,FL-USAKrieger Publishing Co., 1967  
 Lynch, Kevin. **The Image of The City** London: The MIT Press, 1960  
 Book of Development Control Regulations by Local Municipal Corporation (latest edition available)  
 Book of AITP Exam study material: 'Planning Law and Legislation' by ITPI New Delhi  
 Guide to Planning Surveys including Landuse Classification: TCPO, Govt of India: 2004



Housing and Urbanization: Charles Correa  
 Garden Cities of Tomorrow: Sir Ebenezer Howard  
 Maharashtra Regional and Town Planning Act, 1966  
 Traffic and Transportation Planning by L.R. Kadiali

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<b>Research in Architecture II</b>			
Subject Code		4201566 (SS)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	3	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	-
		Viva (External)	-
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	50
		Total Credits	2

**COURSE OBJECTIVES:**

- To enable students to undertake research focussed on an issue related to the built environment.
- To report research in a technical manner.

**COURSE OUTLINE:**

- Unit I Data collection and Analysis preferably with use of statistics
- Unit II Presentation of data using various techniques (verbal, visual, graphical, numerical)
- Unit III Technical writing
- Unit IV Presentation of a research paper in form of a seminar

**SESSIONAL WORK:**

- Tutorial based on units I to III.
- To undertake original research work on the research proposal prepared in Semester VII and report the research in form of a technical paper of 4000 words minimum.

**NOTE:**

- The guide must have minimum 5 years of teaching experience. Preferably a guide should not guide more than 8 students.
- It is desirable that the research seminar is presented in front of experts.
- It is beneficial to the students if the topic of research is related to the architectural design project of semester X.

**REFERENCE BOOKS**

Babbie, E. *The Practice of Social Research*. third edition. Belmont: Wadsworth Publishing Co., 1983. book.

Cresswell, J.W. *Research Design: Qualitative and Quantitative Approaches*. Thousand Oaks: Sage 1994. Book.



- De Vaus, D.A. *Surveys in Social Research*. Jaipur: Rawat Publications, 2003. Book.
- Dey, I. *Qualitative Data Analysis: A User Friendly Guide for Social Scientists*. London: Routledge, 1993. Book.
- Groat, L. & Wang, D. *Architectural Research Methods*. New York: John Wiley and Sons Inc., 2002. Book.
- Kothari, C.R. *Research Methodology: Methods and Techniques*. New Delhi: Wishwa Prakashan, 2005. Book.
- Michelson, William. *Behavioural Methods in Environmental Design*. Stroudsburg, Pennsylvania: Dowden, Hutchinson and Ross, Inc., 1982.
- Nachmias, C.F. & Nachmias, D. *Research Methods in Social Sciences*. Great Britain: St. Martin's Press Inc., 1996. Book.
- Patton, M.Q. *Qualitative Evaluation Methods*. Newbury Park: Sage Publications, 1980. Book.
- Sanoff, H. *Methods of Architectural Programming*. Vol. 29. Dowden Hutchinson and Ross, Inc., 1977. document.
- . *Visual Research Methods in Design*. USA: Van Nostrand Reinhold, 1991.

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<b>Quantity Surveying And Estimation - II</b>			
Subject Code		4201567 (PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	03	Sessional (Internal)	Nil
		Sessional (External) Viva	Nil
		(Internal)	Nil
		Viva (External)	Nil
		In-semester exam	30
		End Semester exam	70
		Total Marks	100
		Total Credits	2

#### COURSE OBJECTIVES:

- To enable students in working out quantities for items of plumbing and sanitation work in a structure.
- To enable students in working out quantities of various items of work for an Industrial structure and acquaint them for preparing rate analysis and indent of material.

#### COURSE OUTLINE:

- Unit I.** Introduction to Analysis of Rate, Factors affecting Rate of any Item of work, Importance of Rate Analysis, Essentials of Rate Analysis.
- Unit II.** Unit Rate, Direct Cost, Indirect Cost, Overhead Charges, Day Work, Task Work, Piece work, Indent of Material,
- Unit III.** Studying and Working out rate Analysis of minimum 20 numbers of standard items of work based on prevailing market rates.
- Unit IV** Studying and preparing Indent of Material of minimum 20 numbers of standard items of work.
- Unit V** Working out quantities for plumbing and sanitation items of work and preparing measurement sheet and abstract for all items of work.



**Unit VI** Working out quantities for Industrial structure of approximately 200-300 sqm with steel Truss and sheet roofing and preparing measurement sheet and abstract for all items of work.

**REFERENCE BOOKS**

- *B.I.S 1200- Part-I 1992.* n.d.
- Prof. B.N.Dutta, *Estimating and Costing in Civil Engineering.*
- B.S.Patil. *Civil Engineering Contracts and Estimates.*
- Dr. Roshan Namavati. *Professional Practice.*
- Rangawala. *Estimating Costing and Valuation.*

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<b>Specification Writing II</b>			
Subject Code		4201568 (PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (Lectures = 1 Studio = 2)	3	Sessional (Internal)	nil
		Sessional (External)	nil
		Viva (Internal)	nil
		Viva (External)	nil
		In-Semester exam	30
		End-Semester exam	70
		Total Marks	100
		Total Credits	2

**DRAFT SYLLABUS FOR APPROVAL OF FACULTY**

**COURSE OBJECTIVES:**

- To acquaint students with methodology of writing specifications with reference to service installations of different items of work in construction.
- To know importance of specifications in contract document for any construction project.

**COURSE OUTLINE:**

- Techniques, Importance & methods of writing different types of specifications of different items of works in construction.
- Technical and functional role of specifications in any construction project.

**Unit I: Detailed Specifications**

- 1.3. Checklist preparation

**Unit II: Specification for Building Services**

- 2.1. Water Supply & Drainage
- 2.2. Acoustics
- 2.3. Electrification
- 2.4. HVAC installation



### Unit III: Building Trades

3.1. Different Building trades scope & contents

### Unit IV: Broad outline specification for service installations

- 4.4. Communication systems- elevators, escalators
- 4.5. Accessibility- arrangements for disabled persons
- 4.6. Water proofing- cement, bitumen, polymer based
- 4.7. External development- roads, pavements, kerbs, lighting

### REFERENCE BOOKS

- Indian Standard specifications
- C.P.W.D. Specifications and schedule of rates
- Specification Writing for Architects & Engineers, By Donald A. Watson
- Specification Writing for Architects & Surveyors, By Arthur J. Wills
- Estimating, Costing, Specification & Valuation, By M. Chakraborty

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ELECTIVE III – ALLIED ELECTIVE			
Subject Code	4201569 (SS)		
Teaching Scheme	Examination Scheme		
Total Contact Periods per week= 2 (lectures=1, Studio=1)	2	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	50
Total Credits	1		

### COURSE OBJECTIVES:

The subject of Electives has been introduced in syllabus with specific intention of study of a particular subject of student's liking in greater detail but in the larger context of overall scope of Architecture syllabus at undergraduate level. This will give students an opportunity to develop their skills in a subject they may opt, to make their career in future.

The allied elective gives opportunity to the students to explore links of design as a faculty with allied fields such as social sciences, visual art, performing arts, psychology, etc.

### COURSE OUTLINE:

Individual College may offer topics depending upon the availability of experts and resource material. The colleges will have the opportunity to focus on a particular group of topics according to the overall philosophy and mission statement of the College. The probable elective topics are – [the list



is only suggestive and individual colleges can frame newer topics which meet the course objectives].

- Music and Architecture
- Environmental psychology
- Art movements and Architecture
- Sociology and Architecture
- Building Economics
- Biomimicry

**SESSIONAL WORK:**

The faculty is expected to set out the broad contour and sub aspects of the particular elective and conduct input and demonstration interactions and define the nature of the sessional work to be done by the students.

The students are expected to present the work done in an **A4 report format of 20 pages**, to include summary of interactions and sessional work prescribed by the faculty with a signed certificate from the concerned Teacher / Expert stating that the study was carried out under his /her guidance and countersigned by the Principal / Academic coordinator.

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# DRAFT SYLLABUS FOR APPROVAL OF FACULTY

# Fifth year 2015 Pattern

## Semester IX

DRAFT SYLLABUS FOR APPROVAL OF FACULTY





<b>Practical Training</b>		
<b>Subject Code</b>	5201570 (SV)	
<b>Teaching Scheme</b>	<b>Examination Scheme</b>	
Student should work for Total 120 working days in organization where architecture or its allied disciplines are practiced under supervision of a professional who is registered with COA India.	Sessional (Internal)	75
	Sessional (External)	75
	Viva (Internal)	25
	Viva (External)	25
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	200
	Total Credits	8

**Objectives:**

- To undertake practical training under the guidance of experts / professionals.
- To Learn about architect's office management and learn about the process of design, execution and management of a project.

**Course outline:**

- Students should work in organization where architecture or its allied disciplines are carried under professional who is registered architect with COA
- In case a student undergoes Training at a firm outside India, the professional should be registered with the professional body governing practice in that country in addition to the registration with COA India.
- Total duration of Professional Training will be 120 working days in IX sem

**Submissions :**

- Prepare a separate report along with formal log book & work diary.
- Student should maintain week wise work record in a diary to summarize the work done in the office, site visits, meetings with clients, agencies, interaction with principal architect. This diary should be authenticated by the architect every week.
- Professionals should issue a certificate of performance to the student with respect to the work quality, overall approach, attitude towards office work.
- Students should produce report, log book, work diary & some drawings with permission from the employer [to indicate the kind of work s/he has carried out] at the time of sessional -viva voce examination.

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# Fifth year 2015 Pattern

## Semester X

DRAFT SYLLABUS FOR APPROVAL OF FACULTY



<b>Elective IV</b>			
SubjectCode		5201572 (SS)	
TeachingScheme		ExaminationScheme	
TotalContact Periodsperweek (lectures=1, Studio=2)	3	Sessional(Internal)	25
		Sessional(External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	nil
		End Semester exam	nil
TotalMarks		50	
Total Credits		2	

### **COURSE OBJECTIVES:**

The subject of Electives has been introduced in syllabus with specific intention of study of a particular subject of student's liking in greater detail but in the larger context of overall scope of Architecture syllabus at undergraduate level. This will give students an opportunity to develop their skills in a subject they may opt, to make their career in future.

Architecture professionals will have to deal with more and more complex buildings as well as organizational structures to realize a project. Architects need to be introduced to "Management Concepts" if they are to manage projects right from design stage through the documentation and construction stage. Acknowledging the fact that the Architectural Practice is a team effort and understanding the necessity of management in this field, the following elective topics have been suggested.

**Note: This elective will not focus on design and technology aspects of the topics offered.**

### **COURSE OUTLINE:**

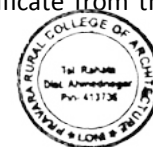
Individual College may offer topics depending upon the availability of experts and resource material. The colleges will have the opportunity to focus on a particular group of topics according to the overall philosophy and mission statement of the College. The probable management elective topics are as follows:

- Project Management
- Construction Management
- Environment and Energy management
- Architectural Design Management

### **SESSIONAL WORK:**

The faculty is expected to set out the broad contour and sub aspects (including basic principles, case studies, application in building projects etc.) of the particular elective and conduct input and demonstration interactions and define the nature of the sessional work to be done by the students.

The students are expected to present the work done in an **A4 report format of 20 pages**, to include summary of interactions and sessional work prescribed by the faculty with a signed certificate from the concerned



Teacher / Expert stating that the study was carried out under his /her guidance and countersigned by the Principal / Academic coordinator.

**Guidelines for content for the electives**

**Construction Management**

Human Resource Management in Construction  
 Contracts and Claims Management  
 Construction Materials, Stores and Inventory Control and Technology Management  
 Construction Equipment Management  
 Construction Quality and Safety Management  
 Construction Site Administration and Control  
 Introduction to Computer applications for construction management

**Project Management**

Soft Skills in Project Management  
 Project Risk Management  
 Project Cost Estimation and Cost Control  
 Contracts and Claims Management  
 Project Procurement and Materials Management  
 Project Quality and Safety Management  
 Introduction to Computer Application in Contract Management

**DRAFT SYLLABUS FOR APPROVAL OF FACULTY**

**Environment and Energy Management**

Environment and Energy Policies and Management in Indian Context  
 Environment Technology Management-Water and Waste Management Technologies  
 Energy Management in Buildings (Demand and Supply Management)  
 Building Management Systems

**Architectural Design Management**

Design Management  
 Drawing and Documentation Management  
 Computer Applications for Design Management

<b>Architectural Design Project</b>			
SubjectCode		5201571 (SV)	
TeachingScheme		ExaminationScheme	
TotalContact Periodsperweek=20 (lectures=4, Studio=16)	20	Sessional(Internal)	175
		Sessional(External)	175
		Viva (Internal)	50
		Viva (External)	50
		In-semester exam	nil
		End Semester exam	nil
		TotalMarks	450
		Total Credits	12



**OBJECTIVE:** To provide an opportunity to the students to apply the **knowledge gained** in earlier years to full-fledged Architectural Design project of student's choice with a holistic approach including background research, programme formulation, site selection investigations and design demonstration.

**COURSE OUTLINE:** The Architectural Design Project shall consist of **Design Demonstration** i.e. formulation of design programme, site investigation and selection, and culmination in architectural design proposal.

**TOPIC FOR ARCHITECTURAL PROJECT:** The topic for the project shall be approved by the Institute and guided by the Faculty. The student may consult external resource persons specializing in the chosen topic but the assessment shall be done by the faculty. **A guide** may guide upto EIGHT students during the session. In order to qualify to work as a Guide, the faculty must possess minimum of **ten YEARS** of teaching / professional experience.

**SESSIONAL WORK:**

The portfolio of the work submitted by the student shall contain MANUALLY LABOURED / COMPUTER GENERATED drawings **of sheet sizes as per international standards** and a PHYSICAL MODEL explaining the architectural proposal. Alongwith the drawings A4/A3 size report consisting of the background and rationale of the project, the methodology and the prints of the final proposal shall be submitted after the oral examination, to be kept in the library of the college. The choice of the size of the report is left to the institute , however, within one institute report size should be constant.

In addition the student may show other presentations like 3D views, walkthroughs etc. if permitted by the examiners.

**SESSIONAL ASSESSMENT:**

The Internal assessment of architectural project shall be carried out STAGE WISE as decided by the college. The final assessment in the examination shall be done by both Internal and External examiner in which the student shall display the work on the space allotted to him/her and explain his work and answer all the queries raised by the examiner.

The examiners shall assess the work done and presented by the student, duly approved by the Faculty. The drawings and models, duly stamped and signed by the Faculty shall be treated as authentic work done by the student under the guidance of the Faculty. The student may submit sufficient number of drawings required to satisfactorily explain the project. The student shall also present a separate portfolio of study & process sheets, study models etc.

**ORAL EXAMINATION :** The oral shall be held in the physical presence of the student in **examination centre of the candidate** jointly by the internal and external examiners. The student shall be allowed to present his project for minimum 10 minutes without any interruption. The student shall be judged for the depth of understanding of the subject and clarity of graphical presentation of the project.

**RECOMMENDED READING:**

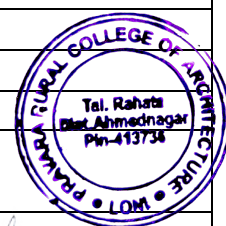
**All books relevant to the topic of the architectural project.**

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<b>C. List of topics in Architectural Design Project course in B. Arch Programme which addresses crosscutting issue</b>		
<b>Sr.no</b>	<b>Dissertation Name</b>	<b>Issues Addressed (Professional Ethics, Gender, Human Values, Environment and Sustainability )</b>
1	Passenger Cruise Terminal At Sindhudurg	Human Values
2	Swar Kalatva Music Academy	Human Values
3	Sustainable Residential School For Tribal Peoples	Environment and Sustainability
4	Culinary arts & Hospitality Management	Human Values
5	low Cost School Building In Rural Area	Environment and Sustainability & Human Values
6	National Skill Training Institute Ahmednagar, Maharashtra	Human Values
7	Economic Empowerment & Live hood Development Unit For Schedule Tribes.	Environment and Sustainability
8	Bhandardara- Tourist Facility & Recreation Centre	Human Values
9	A Universally Accessible Cottage Industry.	Human Values
10	Climate Responsive Building in Hot & Dry Region At Narayangoan	Environment and Sustainability
11	Nature Cure Center	Human Values
12	Language Museum	Human Values
13	Art Culture & Heritage Centre At Jaipur, Rajasthan	Human Values
14	Juvenile Correction & Rehabilitation Center	Human Values
15	Women Empowerment Center At Yerwada	Gender, Human Values
16	Forest Research & Training Institute At Bhandardara	Environment and Sustainability
17	International Convention & Exhibition Center At AURIC	Human Values
18	College of Naturopathy & Yogic Science & Naturopathy Centre, Trimbakeshwar	Human Values
19	Wellness Healing Centre	Human Values
20	Bamboo Resort	Environment and Sustainability
21	Convention Centre	Environment and Sustainability
22	Organic Architecture -Living with Nature	Environment and Sustainability
23	Eco Tourism & Nature Interpretation Centre for Natural Heritage	Environment and Sustainability
24	Skill Development Centre	Human Values
25	Agro Tourism : The Link Between Agriculture & Tourism	Human Values
26	Urban Park With Amenities	Human Values
27	Educational Centre for Physically Special Students	Human Values
28	Passive Design Strategies	Environment and Sustainability
29	Veterinary Hospital & College of Veterinary Sciences & Animal Husbandry Swami Yogita Rajesh	Human Values
30	History of Hampi	Human Values
31	Mud Construction A Step Towards Sustainability	Environment and Sustainability





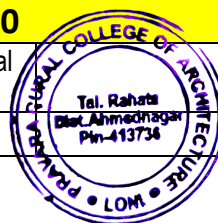
32	Tribal Artist Village	Human Values
33	Riverfront Development of Godavari From Ramwadi TO Panchvati	Human Values
34	Kala Gurukul ( Nriyangana)	Human Values
35	Design of a Carbon Neutral Business Centre	Environment and Sustainability
36	Art & Culture Centre	Human Values
37	Savali-Assisted Living & Independent Accommodation for Senior Citizens	Human Values
38	Revitalizing Heritage Architecture -in Case of Bhimashankar	Human Values
39	Residential School As Bala	Human Values
40	Thesis -Artist Village	Human Values
41	Multispecialty Hospital ,Nandurbar	Human Values
42	Alandi	Human Values
43	Eco- Village	Environment and Sustainability
44	Co-working Space Bkc Mumbai	Human Values
45	Design strategies in hot and dry climate	Environment and Sustainability
46	Courtyard planning in modern architecture	Environment and Sustainability
47	Phycology of spaces	Human Values
48	Role of acoustic in architecture	Environment and Sustainability
49	Rural development center at menavali (wai)satara district	Human Values
50	Importance of cultural historic heritage and promote potential towards tourism at Junnar region	Human Values
51	Designing public spaces by psychological approach	Human Values
52	Adaptive re-use of defunct mill precinct of Mumbai	Environment and Sustainability
53	Planning aspects of natural light	Environment and Sustainability
54	Advanced landscape	Environment and Sustainability
55	Bio mimicry and design process	Human Values
56	Energy efficient building	Environment and Sustainability
57	Affordable building material and techniques	Environment and Sustainability
58	Openings in architecture	Environment and Sustainability
59	Spiritual architecture	Human Values
60	Organic architecture	Environment and Sustainability



  
**PRINCIPAL**  
Pravara Rural College of  
Architecture, Loni



<b>D. List of events/ Programme/workshops/seminars etc.. Organised by institute in B. Arch programme which addresses crosscutting issues (from 2017-18 to 2022- 23)</b>		
<b>Academic Year</b>	<b>List Topic of program/Event/ workshop/seminar etc.. Organized by institute</b>	<b>Crosscutting issues</b>
<b>2022-23</b>		
2022-2023	Webinar On 'Housing Concepts'	Human Values
2022-2023	Seminar On Mud Architecture	Human Values
2022-2023	A WEBINAR On 'Urban Heritage Conservation'	Human Values
2022-2023	Expert lecture by Ar.Jyotindra Nikam	Professional Ethics
2022-2023	Expert lecture by Mr. Devendra Damle	Professional Ethics
2022-2023	Seminar on Sustainable planning by Ar. Vijay pandey and Ar Sameer Shinde	Environment and Sustainability
2022-2023	Workshop on Madhubani Painting	Human Values
2022-2023	Virtual National Conference on Peri-Urban Architecture and Planning	Environment and Sustainability, Human Values, Professional Ethics
2022-2023	Seminar on Basics of Accounting and Book keeping	Professional Ethics
2022-2023	Webinar on HVAC	Environment and Sustainability,
2022-2023	Webinar on Urban studies	Human Values
2022-2023	Cyber security Awareness Program	Human Values, Gender
<b>2021-22</b>		
2021-2022	Webinar on Introduction to Design of Industrial Buildings	Professional Ethics
2021-2022	An online guest lecture on 'Unified Development Control and Promotion Regulations' by Ar. Sachin Vidyadhar Kulkarni	Professional Ethics
2021-2022	An expert lecture and interactive Session on 'Designing of Milk Processing Unit ' By Ar. Trimbak D. Gadgil	Professional Ethics
2021-2022	Online Expert Lecture on 'Urban Planning, Development and Associated Legislations' by Ar. Sameer Shinde	Human Values
2021-2022	Virtual National Conference on 'Rural Architecture and Regional Planning'	Human Values, Environment and Sustainability
2021-2022	Webinar on Concept Development for Architectural Design Project	Professional Ethics
<b>2020-21</b>		
2020-2021	Webinar on Counseling Session - Careers In Architecture Visualization	Professional Ethics
2020-2021	Research Approach for Students of Architecture to initiate Research at Under Graduate Level	Human Values, Environment and Sustainability
2020-2021	Manthan-Webinar on Palaces of India - Falaknuma Palace - Hyderabad	Human Values
2020-2021	Manthan-Webinar on Mind Antivirus	Human Values
<b>2019-20</b>		
2019-2020	Application of universal design - need of architectural industry and architectural education	Human Values
2019-2020	Seminar on personality development- Zero to Hero	Professional Ethics







	Presentation	
<b>2018-19</b>		
2018-2019	Advance cad seminar	Professional Ethics
2018-2019	Intellectual property rights: a new age challenge	Professional Ethics
2018-2019	Principles and elements of urban planning	Professional Ethics

Sr. No.	D. Activity by the institute for the promotion of crosscutting issues	Crosscutting issues
1	Poster Competition on Save girl child to create awareness	Gender
2	Savitribai Phule Jayanti	Gender
3	Women's day	Gender
4	Seminar on personal hygiene practices	Gender
5	Women empowerment and social development program	Gender
6	Mind Power workshop	Gender
7	Street play at social gathering places on gender awareness and about gender issues	Gender
8	Girls and boys using equipment's in hands-on workshops	Gender
9	Sports and cultural events promote equal participation from girl students	Gender
10	College student's secretary showing women's leadership and representation in decision-making roles	Gender
11	Woman's Anti-harassment Committee	Gender
12	Girls' and boys' students using common rooms	Gender
13	The gradation project that final year students choose are sometimes inspired by gender sensitization. For example, Woman impairment centre	Gender



  
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